THE

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Editorials.

I HAVE much pleasure in intimating to the readers of the VETERINARY JOURNAL that from the 1st January 1903 I shall have the collaboration of Veterinary-Lieutenant-Colonel JOSHUA A. NUNN, D.S.O., C.I.E., Deputy Director-General of the Army Veterinary Department, in the editorship of the JOURNAL. This change has been rendered desirable by the pressure of various kinds of business upon me. My time is so much occupied with the work of the New Veterinary College, with consultations in various parts of the country, with Government service and private duties, that I am unable to give the JOURNAL the attention which it requires, and which I should like to give it. The conjunction of Colonel NUNN as joint editor will be a double advantage, it will relieve the pressure on me, and it will open out new fields of thought and observation for the benefit of the readers of the JOURNAL. The Publishers, Messrs. Baillière, Tindall, & Cox, highly approve of the change. They think, and think rightly, that a Journal like the present, in order to appeal to as wide a circle of readers as possible, ought to have a very wide basis, ought not in any way to be local or provincial. This desirable object will be attained when Colonel NUNN collaborates with me, as the VETERINARY JOURNAL will then practically double its basis, and be edited from two capitals—London and Edinburgh. The best professional thought and the freshest professional experience ought thus to find expression in its pages, and greater vitality will, I feel sure, result from the fortunate combination. Colonel NUNN, as the whole world knows, is a man of wide knowledge and great skill. He is well known in the hunting-field, he stands high in the councils of the Army, he has travelled much, and therefore knows the veterinary world at home and in the Colonies and Dependencies of the Empire. He has frequently contributed to the pages of this JOURNAL, both as an original writer and as an elegant and careful translator from foreign veterinary works. He is therefore no stranger, his work bears witness to his abilities, and his character is a guarantee for excellence and thoroughness. I therefore foresee a bright future for the JOURNAL, and I trust that the extension of the editorship, coupled

with the lowering of price already announced, and the introduction of the scheme for announcing vacant situations, &c., will bring about a great increase in the number of readers of the VETERINARY JOURNAL. W. O. W.

IRELAND *v.* THE REST OF THE COUNTRY.

AMIDST the pæans of victory and the shouts of satisfaction which accompanied the opening of the Royal Veterinary College of Ireland we could trace no sound of the modest self-depreciation which would have been quite appropriate to the occasion. Everything was laudation, nowhere was there recognition of the fact that the whole thing was the result of protective action on the part of the Government, that the result was in fact very largely artificial. We regret very much to notice the complete absence of everything like acknowledgment of the debt due to English and Scottish veterinarians. A great deal of fuss was made of the visit of Professor Nocard, for professional purposes, to the south of Ireland some time ago. The Hon. Horace Plunkett spoke of the "brilliant research work" done by M. Nocard, and congratulated his hearers on the fact that not a word of protest had been raised against getting a foreigner to come in and conduct that work, attributing this approval, or this silence, to the advent of a new spirit into Ireland. We wish we could take the same optimistic view. We have personally the greatest admiration for M. Nocard, and look upon him as one of the most brilliant operators in the world. We have indeed benefited by personal contact with him, both in our student days and in the course of our professional career; but, having said so much, we must express our regret that the Irish authorities went so far afield for assistance and advice. M. Nocard was not called in as a specialist; had he been so, we should have rejoiced to see him, just as we should have rejoiced to see a distinguished German or Italian veterinarian. There is a distinguished Spanish physician at the present moment whose advice on cases of nervous disease is eagerly sought in France and Germany, and even in England, and this is as it ought to be. But M. Nocard's position was quite different. Readers of the VETERINARY JOURNAL will remember our translation of his report on the investigation which he made. It was characterised by the thoroughness and by the clearness of exposition which M. Nocard has made his own, and, we may add, by the politeness and courtesy which distinguish the cultivated Frenchman. But he might have summarised the report in one word, and that word was—Dirt. Surely it was not necessary to go to France for such a diagnosis. If the Dublin veterinarians felt themselves unequal to the task they might have called in an English colleague. We fear Mr. Plunkett's "new spirit" is not at all new and not at all wholesome, but is simply the old and evil

spirit of ignorance and jealousy. What will veterinary Europe think of Ireland, scientifically and morally?

Sir Christopher Nixon informed his audience that the Irish College was a success. We are not surprised, for Sir Christopher went on to explain that the Government had given "substantial aid," and had shown a "sympathetic spirit" to the College. In the larger island we have had infinitesimal doses of the latter, but the former has been practically a minus quantity. We have supplied the Army with capable Veterinary Officers: the Government has supplied Ireland with £15,000 and a bonus—shall we call it?—of £5000. Not satisfied with this, Ireland is looking for more, and Mr. Plunkett claps Ireland metaphorically on the head, and, without committing himself, indicates that more may be forthcoming if Ireland can make out a good case. As a result of this pampering we learn that the Irish College, which started with thirty students, and in its second year had fifty-eight, now musters some eighty, and hopes, by absorbing sixty more, to win back all the Irish students from their *almæ matres* in England and Scotland, and then, buttressed by an indulgent Government, intends to "annex" students from England, Scotland, and the Colonies. Sir Christopher Nixon shelters himself behind this pretty euphemism "annex"; we don't like euphemisms and prefer to call a spade a spade.

A number of undeniable statements followed this vaunt. We are told that not only will the College have an important influence on the education of veterinary students coming from the various parts of Ireland—plus Great Britain and the British colonies—but that it will likewise exercise an important influence upon the future of agriculture in Ireland. Sir Christopher dilated by the way on the importance of maintaining the live stock of the country in a healthy condition, and of educating the agricultural classes in the breeding, feeding, and care of their stock. To all this we would reply, Is the education of British veterinary students not equally important? Are the horses of Yorkshire and Suffolk, Cambridgeshire and Lincoln, Ayrshire and Berwick, not as fine animals as the Irish horses? Who will deny that the herds of cattle in Herefordshire and Devon, Forfar and Aberdeen, are as much a matter of vital interest to the country at large as the cattle of Waterford and Wicklow? If these facts are incontestable, why does not the Government make provision for the education of young Englishmen and Scotsmen in their native countries? Why does it treat us like a stepmother and lavish its gifts on Ireland alone? Our questions seem to us unanswerable; the Government has put itself in a dilemma from which it can escape by only one means. "The action of the Department," says Sir Christopher, "shows that it fully concedes the important position which a veterinary college should hold towards the State." Does it? We think not. We would amend the phrase and say, "The action of the Department shows

that it is beginning in a halting and imperfect manner to realise the importance of veterinary education?" In Scotland veterinary education owes everything to the philanthropy and patriotism of the late Professor Dick, and to the enterprise and initiative of his successors, and these influences have been at work for over fifty years, during all which time the Government has remained inert and supine. The beginning of better things has occurred in Ireland, and we rejoice as patriots at Ireland's good fortune; as private citizens, as practitioners, as teachers, as men of the older generation, with sons to educate in veterinary medicine, we grumble, and think we have good cause for grumbling.

Sir Christopher Nixon proceeds to emphasise the truths—which are now truisms—so frequently enunciated and expounded in the columns of the VETERINARY JOURNAL, regarding the important bearing of veterinary teaching on human medicine. We of course most earnestly endorse all that he says in this connection, and commend his words to the attention of Government Departments, and to University authorities and scientific bodies. We learn from Mr Plunkett that the Royal Dublin Society took an important part in the establishment of the Veterinary College: here is an opportunity for the Royal Agricultural Societies of England and Scotland to distinguish themselves by taking a part in valuable educational work. Further, we learn that profound thinkers like Mr. John Morley and Mr. Gerald Balfour, approaching the matter from the purely philosophic and administrative side, have given their aid to the College—just as was to be expected from two such eminent men—after a comparatively short acquaintance with the facts of the case. Lastly, we find that Lord Ardilaun—better known to some of us by his family name of Guinness—was and is deeply interested in the matter. Why do not some of our great capitalists emulate this patriotic Irish nobleman, and give some of their superfluous wealth to the establishment of veterinary teaching in Great Britain on a firm basis?

It is surely not necessary to say in conclusion that the English and Scottish Colleges ask for no indulgence; they only crave equal treatment for the whole country, and the abolition of everything that tends to monopoly, as the Irish scheme clearly does. We will quote Sir Christopher Nixon once more: "The veterinary college illustrates what I believe Mr. Gill describes as the 'State-in-aid-based-on-self-help' plan of the Department, and I believe that I express the view of the Governors of the College when I say we desire no aid except we can establish a claim for it by meritorious work done; it is in this spirit we look to the Department." This is exactly the position of the English and Scottish Colleges; we base our claim on our merits, we are proud of our past, we do not wish to be deprived of our future.

Original Papers.

BOVINE PASTEURELLON IN THE MALAY PENINSULA.

REPORT TO THE GOVERNOR-GENERAL OF INDO-CHINA BY M. CARRONGEAN, DIRECTOR OF THE PASTEUR INSTITUTE OF NHA TRANG, ANNAM.

To the Governor-General.

SIR—According to the instructions given by you, dated September 30, 1901, directing me to investigate into and report on Rinderpest in the Malay Peninsula, I have the honour to forward you this report on the work I have performed in the Province of Malacca.

I.

For several years past the Malay Peninsula has been ravaged by severe outbreaks of disease, both buffaloes and cattle perishing by the thousand, especially in the provinces of Malacca, Negri Sembilan, Pahang; also in Perak, Selangor, and Penang, but not so severely. Outbreaks appeared simultaneously in localities far apart that were not in communication with each other, and in fact which were separated by natural obstacles.

The mortality is very great, viz., 80 to 100 per cent. of buffaloes, 50 per cent. of imported Siamese cattle, and 30 per cent. of Indian. The disease has been officially known as Rinderpest.

The Colonial Secretary of the Straits Settlements having noticed the articles published by Dr. Yersin in the *Recueil de Médecine Vétérinaire* for January and February 1901 on Rinderpest, in July last sent an indent for serum to the Pasteur Institute at Nha Trang. Before commencing inoculations on anything like a large scale, it was deemed advisable to ascertain for certain if the disease were true rinderpest, and therefore Dr. Yersin suggested to the Governor-General the advisability of my being deputed to report on the matter.

I arrived at Singapore towards the end of October 1901, and received most valuable information from the French Consul at that port as to the localities in which the disease existed.

Mr. Keiter, superintendent of the Selangor Tin Mining Company, accompanied me to the infected localities in Seremban, Kuala Pas, and Negri Sembilan, and rendered valuable assistance. I must also thank Dr. Hamilton Wright, of the Pathological Laboratory at Kwala Sumpor, who placed his resources at my disposal. Mr. Ford, Veterinary Surgeon to the Government of Kwala Sumpor, also accompanied me during my investigations, and his aid was invaluable.

Before giving details of my researches, I will state that the result has been that *rinderpest does not exist in the Malay Peninsula, and that it has been confused with hæmorrhagic septicæmia of bovines*, which assumes most varied forms, from the acute type, which is mistaken for anthrax, of the buffalo, to the chronic, th nature of which is difficult to recognise. That the disease in the Malay States has been mistaken for rinderpest can only be accounted for by its being insufficiently and superficially studied.

The knowledge of the numerous observations on hæmorrhagic septicæmia that have been made of late years, especially those of Lignieres, will not permit this mistake to exist longer.

II.—EPIDEMIOLOGY.

It is difficult to give a precise idea of the importance of the outbreaks of the disease. Their frequency and the loss caused are only known approximately, as the number of animals that have perished is unknown, it being impossible to obtain statistics from such a large and thinly inhabited country. The annual Government reports mention rinderpest, and a few illustrations will show that the loss is considerable. The medical reports show that there was great loss in the State of Penang in 1896, 1899, 1900. —(*The Penang Government Gazette*, 1st July 1901, Medical Report.) More than 5000 buffaloes died, and the Resident remarks that wild animals, especially wild boars, were first attacked, and afterwards buffaloes, and this important point has been frequently noticed. This alone is sufficient to show that the disease is not rinderpest, which if it be transmissible to wild animals, deer, and antelopes, is not to pigs. On the contrary, it has long been pointed out by Bollinger, 1877, that hæmorrhagic septicæmia can appear successively or simultaneously in wild animals and oxen and buffaloes, and on this account is known in Germany as "Wild und Rinderseuche."

In Penang, in 1900, Mr. M'Arthur, Government Veterinary Surgeon, saw 169 cases; 90 died, 70 were destroyed, and 9 cured. In Negri Sembilan 3000 buffaloes died in 1900-01, and the Province of Malacca suffered severely.

The disease exists in several centres, and it is almost impossible to account for the outbreaks.

Under certain ill-defined conditions, such as the season, humidity, temperature and feeding, the bacteria that is the cause, and which probably lives for an indefinite period in the soil as a saprophyte, is awakened into increased activity, and isolated cases are produced, which are usually extremely severe; in fact, the earlier ones are almost invariably fatal.

These cases are most dangerous, as they can carry the contagions to a distance and create new centres, and this theory is confirmed by the fact that if the diseased are at once isolated the epizootic will be nipped in the bud.

The disease has been prevented from invading Selangor, thanks to the strict quarantine that has been instituted by Mr. Ford. Klang having been declared an infected centre, has been placed under surveillance; a certain number of animals have died and others cured, and the outbreak been checked without being communicated to other places.

When the outbreak extends, the virus appears to become attenuated, the weakly die, the more robust living from eight to fifteen days, and a certain number recovering. After several weeks or months more recoveries take place, and only isolated cases are seen.

To sum up, it appears that centres are created suddenly under certain conditions independent of contagion, but that after a time the organism acquires a high degree of virulency, and this contagion exercises a preponderant part in its extension.

In this way the epizootics that decimate the country are caused, and their continuance may be accounted for. This differs considerably from *rinderpest, which extends by contagions.*

III.—SYMPTOMS.

Bovine hæmorrhagic septicæmia manifests itself in various forms, sometimes acute, developing in a few days, and sometimes chronic.

In the acute form, which is the one generally seen in the buffalo, the animal is attacked suddenly. He separates himself from the herd, stands still with his head hung down, and is in a high state of fever, the temperature varying from 40° to 41.5° C. He refuses all food, stops ruminating, the respirations are quickened and pulse rapid, the mucous membranes of the nose and eyes are injected and discharged serum.

The fæces are black, tarry, and tinged with blood, but the course of the attack is so quick—twenty-four to forty-eight hours—that the symptoms have not time to develop before death takes place. Œdema may be observed in various parts, but in many instances this is absent.

In the subacute form the premonitory symptoms may remain unnoticed; two to four days after fever appears, the temperature ranging from 39.5° to 41° C. The animals separate themselves from the herd, become dull and sleepy; rigors set in and groaning. The appetite is diminished, respiration is irregular, and there is constipation.

The next stage is profuse flow of tears and diarrhœa, which becomes more and more abundant. At first it is thin, watery, and tinged with blood. It then becomes fœtid, dysenteric, and exhausting. The patient continues to take a little food, but rapidly loses condition. The eyes are sunk in the orbit, the face pinched, and the mucous membranes highly congested and temperature elevated. The crisis is reached in ten to eighteen days, when the animal lies inert in a state of collapse, the head thrown round on to the thorax, and death taking place in twenty-four to forty-eight hours.

In some cases pulmonary complications are seen, with cough, in others grinding of the teeth. Some recover, but the diarrhœa lasts a long time, and the animal is extremely debilitated. In others there is an eruption of papules on the skin, which may be confluent, covered with thick crusts that are exfoliated, and almost appear like portions of necrosed skin.

During the febrile stage the blood is virulent, and if healthy animals are inoculated the disease is reproduced. This has been proved by Dr. Braddon, of Seremban, who, following on the researches of Kolle and Turner with rinderpest, endeavoured to apply the protective serum method of inoculation to what was supposed to be that disease. He also proved that after passage through several animals the virulency became attenuated, whereas, on the contrary, in rinderpest the virulency is fixed, and is not attenuated by passage through several animals, and in fact Nicolle, of Constantinople, has shown that it is increased.—(Nicolle, *Annales de l'Institut Pasteur*, 1901, page 715.)

The disease may take on a chronic form, commencing by a variable degree of fever. The animal feeds badly, has a cough, muco-purulent discharge from the nose, flow of tears, diarrhœa, and loss of condition. A certain number die from emaciation, others recover after a considerable time. This is generally seen in the case of oxen.

IV.—LESIONS.

The lesions vary in the acute, subacute, and chronic forms. There are general lesions implicating all the organs, viz., hæmorrhagic and congestive. In the acute form the subcutaneous vessels are dilated, all the capillaries

being engorged with blood, the subcutaneous tissue being hæmorrhagic and œdematous, with yellow infiltrations of variable size in places. The superficial lymphatic glands are enlarged and engorged with blood; on section they are red, succulent, and ecchymosed.

The muscles may be red and studded with ecchymoses, or on the contrary pale and but slightly altered.

On opening the thorax there is a turbid exudate, tinged with blood, and containing yellow-coloured fibrous false membranes, with recent adherences between the costal and pulmonary pleuræ. The pleural capillaries are injected and well marked, and the whole membrane of a bright red colour.

The pericardium is also altered, containing a pink exudate, and it and the heart are covered with spots of ecchymoses.

The lungs vary in appearance. Often they are simply congested, infiltrated at the lower border, and œdematous and emphysematous at the anterior lobes. They may be congested throughout their entire substance, red in colour, with patches of reddish brown or violet hepatisation. These patches are sometimes large and separated from each other by permeable lung tissue. If these patches are large the infiltrated tissue somewhat resembles contagious pleuro-pneumonia.

The mucous membrane of the bronchii and trachea is greatly inflamed with deep red patches of ecchymoses and infiltration of the submucus tissue.

In the abdominal cavity there is a quantity of fluid that may be clear, or on the other hand may be sanguineous and turbid, with flakes of fibrine.

The peritoneum and epiploon are congested, very vascular, and covered with fibrinous deposits in flakes. The exterior of the intestines is injected and red or violet in colour, the whole being highly inflamed, all degrees being present, from congestion to hæmorrhagic necrosis. These alterations are especially noticeable in the fourth stomach, the mucous membrane of which, with that of the intestines, is of a red or often dark brown colour, covered with an inflammatory exudate that is often hæmorrhagic, studded over with bands and patches of ecchymoses. These appearances are specially well marked in the region of the lymphatic glands and the neighbourhood of the ileo-cœcal valve. In the vicinity of Peyer's patches the membrane is in a state of necrosis, patches being detached and leaving depressions that resemble ulcers, but which, however, never perforate the wall. The contents of the bowel are fluid, of a greenish grey colour, mixed with blood and flakes of mucus.

The mesenteric ganglia, especially on the edge of the intestines, are enlarged, red, full of fluid, and hæmorrhagic. The spleen is normal. The liver is congested, firm, and the gall bladder distended. The kidneys are congested, hæmorrhagic, and there is nephritis. Cases may be seen in which there is such intense inflammation that the capillary vessels are ruptured and hæmorrhage takes place into the pelvis or even the uriter. The bladder is injected.

The cerebrum, cerebellum, and spinal cord are congested, and on section hæmorrhagic puncta are seen. The vessels of the membranes also are injected, and the cord is bathed in a pink exudate. In the chronic form all the lesions are seen, but in a lesser degree. The animals are greatly weakened by the diarrhœa, and lose condition very fast.

If the patient has been ill a long time, after death only a little congestion of the intestines and serous membranes is seen, with a clear fluid in the pleura, pericardium, and peritoneum.

V.—DIAGNOSIS.

The epizootic of the Malay Peninsula has always been looked upon as rinderpest, and this diagnosis has been founded upon the gravity of the disease, the rapidity with which it runs its course, the virulent symptoms, and the congestive and hæmorrhagic lesions.

The observers have been too early lead astray by them. To the public any feeble epizootic is "a plague," and any one that destroys a number of oxen or buffaloes is "cattle plague." This has lead to this particular epizootic being called rinderpest.

The chief diagnostic facts are as follows:—The pseudo-"rinderpest" of the Malay Peninsula destroys more buffaloes than oxen, whereas it is well known that in true rinderpest the reverse is the case, a large percentage of buffaloes recovering.

Gamyer,[1] Galtier,[2] and Nocard[3] all confirm this, and the latter author states, "a disease that destroys a large number of cattle and but few oxen is not true rinderpest."—(Nocard and Leclainche.)

These facts are also confirmed by certain Russian authors who have studied the disease in the Caucasus where it is in evidence, and M. Nicolle, who has worked at the subject since 1897 at Constantinople, has proved that the buffalo is not very susceptible to inoculation.[4]

It may be objected that certain races of animals develop powers of resistance, as the Algerian sheep to anthrax, which kills large numbers of sheep in France, and the "steppe" cattle of Russia, as is well known is highly resistant to rinderpest. It may be possible that the Siamese ox of Indo-China may be specially immune and the buffalo susceptible, but there are other arguments that can be brought forward to prove that the disease in the Malay States is not rinderpest.

The spread of the disease has to be considered, as it takes place in defined localities, whereas rinderpest spreads by contagion.

There are general symptoms, as in common with rinderpest, but the lesions of the mucous membranes are not so intense; furthermore, in the former chronic cases are seen, which is not so in the latter disease. In rinderpest there are always acute lesions of the membranes, with croupal exudations, and ulcers always present, whereas in hæmorrhagic septicemia they are exceptional. The rabbit and guinea-pig are susceptible by inoculation, whereas they are not to rinderpest.

VI.—EXPERIMENTS.

Although I was only a short time in the country, and there were only sporadic cases to be found, I was able to show that a characteristic micro-organism was present.

In these experiments I was guided by the work done by Hueppe in 1886, and specially by that of Lignieres' method of inoculating the organism through the rabbit and guinea-pig, which prevents any error taking place.

Blood films on cover-glass taken from the living buffalo showed nothing, although stained in different ways.

[1] Gamyer, The Cattle Plague, Soudan, 1866, vol. I.
[2] Galtier, Traite du Maladies Contagieuses, 1897.
[3] Nocard and Leclainche, Les Maladies Microbiennes des Animaux, 1898, pages 357, 365, 370.
[4] Nicolle, Annales de l'Institut Pasteur, 1901, page 715.

The usual culture media when sown with blood and pulp from the lymphatic glands, liver, spleen, kidney, and lung, give abundant cultures.

From amongst those I have isolated a caco bacillus that is characteristic of the "Pasteurella," to which family the organism of hæmorrhagic septicæmia belongs.

Guinea-Pig.—Peritoneal injection of blood from a buffalo or ox taken during the febrile period or after death, kills the guinea-pig in a time varying up to forty-eight hours, there being hæmorrhagic peritonitis, the pink fluid in the abdomen, blood, and pulp of the organs yielding the specific organisms.

Rabbit.—The subcutaneous inoculation of blood taken ante-mortem kills the animal in a period of time varying with the virulency of the epizootic. In some cases I have seen it take place in twenty-four hours. Cultures from the blood and organs produce the specific organism, but on inoculation it becomes attenuated in the first passage through the body of the subject. This can, however, be easily understood, as the virulency of the organism of hæmorrhagic septicæmia is not staple.

In others death takes place in from four to eight days. In the rabbit blood taken directly after death contains the organism in a pure state, but in a few hours numerous others are found with it.

Characteristics of the organism.—The organism is a small short bacillus, resembling that of fowl cholera, with rounded extremities and a clear central space. It is immobile, colours well with Ziehl's fuchsine and thionine, but not with Gram's stain.

Cultures.—It is ærobic and grows best at 38° C. It causes turbidity in peptonised broth with a strong smell in twenty-four hours. This turbidity is deposited at the bottom of the tube in a few days, the supernatant fluid remaining clear, with a ring round the surface. It does not coagulate milk, cause fermentation in sugar, grow on potatoes, or form indol.

On gelose in twenty-four hours it gives characteristic colonies in small round patches with a transparent blue tint, which eventually becomes opaque.

Experiments.—The organism is pathogenic for the rabbit, guinea-pig, pigeon, rat, calf, and buffalo.

Inoculation of the guinea-pig and rabbit with pure broth culture reproduces the same symptoms and lesions as are obtained from virulent products obtained from the ox and buffalo.

Inoculation of the buffalo and ox give rise to various manifestations, depending on the virulency of the case from which the material has been collected.

That with which I worked was of a low degree, and pure cultures only caused flow of tears, nasal discharge, diarrhœa, and fever. This fact may be accounted for by the fact that I arrived at the end of the epizootic and only saw sporadic cases of a mild type.

Fifteen cc. injected intravenously in two calves gave rise to fever, diarrhœa, and loss of appetite in twenty-four hours, with slight variations of temperature. The animals became gradually emaciated and died one in four and the other five weeks, showing all the symptoms of chronic hæmorrhagic septicæmia, especially chronic pleurisy and peritonitis.

These experiments show that the epizootic in the Malay Peninsula is not rinderpest but hæmorrhagic septicæmia, a pasteurellon which is known in Java, the Phillipines, and Indo-China.

In Java, after being for a long time mistaken for rinderpest, its true nature was shown by Van Ecke and Hubenet, and in Indo-China by M. Blin of the Pasteur Institute of Nha Trang.

The question of preventive inoculation will have to be considered, and as it has been applied to certain other diseases, such as fowl cholera, there is reason to suppose that when modified to suit the conditions of the far East it would be applicable in this case also.

SUMMARY.

I. The epizootic of the Malay Peninsula is not rinderpest, but bovine pasteurellon or hæmorrhagic septicæmia.
II. It is manifest in three principal forms :
    1. Subacute or septicæmic.
    2. Acute with various local manifestations.
    3. Chronic.
III. They are all due to the same microbe, viz., an ovoid organism of the germ pasteurella.
IV. The microbe varies in virulency.
V. The possibility of preventive inoculation is hopeful.
VI. What has been observed in the Malay States is equally applicable to Indo-China.

Translated by JOSHUA A. NUNN, F.R.C.V.S.

PARTURITION AND SOME TROUBLES ASSOCIATED WITH IT.[1]

BY E. P. EDWARDS, M.R.C.V.S., MOLD.

MR. PRESIDENT AND GENTLEMEN,—Having in a weak moment consented to try my 'prentice hand at writing a paper for our Society, I have chosen for my subject one which, though it may be called hackneyed, is yet one which I thought would prove of practical and general interest to a Society consisting very largely of country practitioners, and I trust it will be provocative of a lively, profitable, and interesting discussion.

I do not intend to traverse the whole ground suggested by my title, for, were I capable, it is too large a field, nor do I intend to go into details of pathology or to quote authorities or call opinions from various works on the subjects dealt with, but rather to speak as I think from my own experience, in the hope of eliciting the expression of yours.

In College days the lectures on parturition and on the methods of delivery in cases of mal-presentation were to me always delightful—delightful in their pristine simplicity. In my heathen ignorance of practical work I had always thought the calving and foaling seasons might bring some tough jobs ; but as the Professor tackled one presentation after another my qualms vanished, it all became so placidly easy and seemed to offer such a field for the exhibition of a skill that would astonish the natives, that I longed to tackle a 17 hands mare with a foal which was trying to step into this world with all four legs at one time.

[1] Read at a Meeting of the North Wales Veterinary Medical Association, at Colwyn Bay, 9th September 1902.

In my notes of these lectures I find the following under the heading of "Breech presentation." "Pass a cord with a slip-knot on to one leg and secure it below the fetlock, give this cord to an assistant, who, whilst the operator presses the hock forward and upward, draws the foot backward into the vaginal passage. Repeat this process with the other hind leg and then deliver by traction on both." Could anything be simpler? Why, it is almost like "pulling a string and the figure will work." I do not quote the above in *any* spirit of disparagement of the learned Professor's lectures, but rather to illustrate what I believe to be true, that in no province of veterinary work is there so wide a divergence between theoretical direction and practical accomplishment as in relation to the duties of the obstetrician. Obstetrics must be learned practically, and one is always meeting with some case presenting new difficulties calling for the exercise of one's native common sense to overcome.

It would be interesting if statistics could be collected from various districts giving the number of cases of difficult parturition, the presentations, and other particulars for comparison, for there are causes which operate so as to be favourable to the production of a larger crop of bad cases in some districts than others. Chief of these, to my mind, is the mating of a large or even medium-sized bull with a heifer which becomes a mother at from twelve to eighteen months old. This is a common practice in my district, and yields one of the toughest cases one can meet with, for though the presentation may be quite normal the calf is too big to come away, and has to be removed literally piecemeal.

The occasions and causes which lead to our help being called for in parturition are very varied and numerous, and in an assembly of veterinary surgeons it would be waste of time to go through the whole gamut of malpresentations and the method employed for their relief, I shall therefore only touch upon a few of the difficulties met with, and give a few points which may be new or at any rate of practical interest.

It is perhaps almost unnecessary to mention how important are the mechanical precautions to be adopted in tackling a difficult case. For myself I prefer a cow to be lying down in the majority of cases, and a mare, if she is quiet, to be standing up. It is of the utmost importance if the patient is down to have the hind end higher than the fore end, and to attain this object I invariably swing her around in the stall or shippon, thus taking advantage of the usual fall in the flooring. The other alternative is to raise the hind end on to sacks or battens of straw, but it is surprising how much more easily this can be done and the patient retained in the desired position when advantage is taken of the fall. In the case of mares which refuse to stand or are dangerous to the operator, it is best to put on the hobbles, which both ensure safety and are very useful to lift by, the rope being passed over a friendly beam and the quarters packed under with sacks of straw.

In commencing a case with the mare, I consider it to be of the utmost importance not only to adopt the most stringent antiseptic precautions throughout the case as to instruments and the water used to soap one's arms with, but also to first of all thoroughly irrigate the uterus with a weak antiseptic solution, which should be hot. This is a very necessary precaution against those deadly and disappointing sequelæ in the mare, such as metritis, septicæmia, and septic laminitis, for decomposition of the membranes and uterine fluids begin so early in the mare, that although our

case may be soon delivered trouble often follows on the neglect of the initial precaution. Another reason why this precaution is a wise one, to my mind, is that we generally find that the farmer or his neighbour has introduced his hand and perhaps also a piece of rope, used likely enough weeks before in "drawing a calf," and it is too much to expect rigid antisepsis here.

For this purpose I use this instrument, which, as you will see, is a sort of miniature probang, and into which fits this metal cup, into which the antiseptic is poured.

In passing I may mention that the irrigation tube is capable of playing many parts, and is very useful in milk fever for the administration of medicine in the comatose stages, the farmer being able to use it quite safely, whilst I have also used it as a probang in calves. The cup is made also so that it will fit into a canula, and so can be used for the direct administration of medicines into the rumen when necessary.

With regard to obstetrical instruments generally, I confess that I do not possess a very elaborate set, and I should be very glad to hear the experience of any of you who have used such instruments as Pollock's porte bands, chain sectors, embryotome, guillotine, &c.

The parturition hooks made with screw joints for portability have in my hands proved a nuisance, and I have abandoned them for those with the shaft made in one piece, for I found that in the necessary turning and twisting in adjusting the hook in the required place, the screw was apt to turn and the instrument become divided into two parts when you least desired it.

We have all probably our own favourite pattern of embryotomy knife. The one I use is an adaptation of the ordinary curved knife, to which I have had welded this copper band, which is also covered with rubber to prevent injury to the finger joints. The objection to the ordinary pattern, to my mind, is that the finger rings are made much too thin, and in a long case cut into the operator's fingers or make them very sore.

The mare is often a very fractious animal to deal with during a difficult case of parturition, and I should like to point out the value of chloroform in some cases where, although the animal is down and hobbled, she continues to struggle and fight, not to speak of the excessive straining so often met with. I do not mean or recommend placing the animal under the full influence of chloroform, but in certain cases where speed is the essence of the contract, I find it a great help to give just sufficient to send her half-way into dreamland; the mare remains conscious but is soothed, the uterine condition modified, and she lies quietly whilst you work your will upon her. This I may say is the very general practice of Scotch medical men, indeed so used to it do the patients become that the doctor allows the woman to have the handkerchief on which the drug has been sprinkled, and she merely takes a good breath of it as she feels the pain coming on, and I have been assured that in this way accouchement becomes quite a pleasurable affair.

I wonder if you have all noticed the great differences that are met with, especially in mares, in the character of the vaginal passage and of the uterus, and their degree of contractility. You put your hand into one mare and you find a great cavity, the walls of which feel tense and tent-like; this mare strains and of course you feel the contraction, but in another case you find the wall of the passage loose and lying in folds like the tent collapsed, and when this mare strains she squeezes all the blood

out of your arm and renders it limp and useless in a very few seconds, adding very greatly to your labour.

It does not appear to be a question of the mare's condition, for I have met with this class of uterus in fat and lean animals, but rather I think to natural conformation and excessive relaxation of the ligaments by which the uterus is attached, and I consider these animals more than ordinarily liable to eversion of the womb.

Mal-presentations.—I do not intend to go into these *seriatim*, but would first call your attention to one which I find rather common in the mare, namely, all four feet presented, with or without the head. It of course depends on circumstances, but I should be glad of your experience in dealing with this presentation. My own practice, whether the head is present and can be secured or not, is to deliver by the hind legs, for I find that the flexible head and neck easily accommodate themselves and fall forward, as also do the fore legs when traction is brought on to the hind legs, whilst the bulky quarters and protruding hocks are much more difficult to push back in the normal method of delivery.

In securing the head of a live foal or calf it is of importance to avoid injury to the jaw by the use of the necessarily thin cord used, and it is also risky to fix a rope around the neck, which may run so tight as to obstruct breathing when the head is drawn through the vulva. I find it a good plan to use a long double cord looped on itself in this fashion. I pass the loop on to the nape of the neck and its lower end in front of the angle of the jaw. I then draw the noose just so tight that it will not slip over the ears, and then by passing the loose end (thus) through the anterior end it becomes locked and will tighten no further, and has the advantage of being very easily undone.

In calves this method is sometimes disappointing, for the rope may slip forward over the forehead, but this difficulty is overcome if the anterior end of the loop is slipped into the mouth instead of under the jaw.

Of course nothing but carelessness can account for including the tongue in one's rope when securing the head in the ordinary way by passing it around the lower jaw. I once did this, and to my horror delivered a calf whose tongue was cut clean through close to the frænum. I held my own tongue and pocketed the calf's, but expected trouble to follow. Some days afterwards I was at the farm again and saw the calf, which the farmer described as doing splendidly and taking his milk well. Examining his mouth I found the stump of the tongue completely healed, and beyond that his bleat was rather a plaintive and apologetic one he suffered no inconvenience, and was sold fat, the owner remaining in blissful ignorance.

I only narrate this in order to ask whether there is some reason why wounds inflicted *in utero* heal more rapidly than ordinary ones, and are not followed by the same degree of inflammatory reaction. At any rate I have a bias of belief in that direction, for I have frequently seen injuries done by hooks in the orbit, and fractures of the lower jaw, followed by very little trouble afterwards.

Independent of false presentations and of the monstrosities which sometimes give so much trouble, the most difficult cases which I find are those in heifers where the calf is simply too big to come away; the mother is perhaps fifteen or eighteen months old and is trying to part with a calf half as big as herself. Frequently, so to speak, both fore legs must be removed before the head can be extracted, followed by perhaps three-fourths

of the chest, when it refuses to budge. I then break several ribs, remove the entrails, and gain four or five inches more, when the loins refuse to allow a passage. Before pushing back the trunk and attempting delivery by the hind legs I find it a good plan to cut through the skin in the flank above the stifle joint, through the tensor fasciæ latæ and the gluteus muscles, thus allowing the femur to slip back and be much further extended on the pelvis, and when this is done on both hind legs it gives considerably more room.

Failing delivery after this, there is nothing to be done but to stitch the skin around the thorax, push it back, get up the hind legs, remove one of them, and let the calf hop into the world headless, armless, and one-legged.

There is a great temptation in cases of this sort where the presentation is normal, and one has plenty to pull by, to go on doing so, with a fatal injury to the uterus as a consequence. If I find that two or three ordinary men pulling do not make reasonable progress I always proceed to embryotomy.

I do not suppose that I can say anything new about embryotomy, but there is one instruction given in the text-books as to how to remove a foal's or calf's leg, with which I do not agree. In the first long cut made through the skin from above the scapula to the foot, I think it is bad practice to cut the skin in a circular manner at the foot; it should, I think, be left attached there, forming a fixed point to work from in skinning the leg upwards, and should only be severed after all the muscles, &c. have been cut or torn down and the leg is practically ready to be withdrawn.

We have all probably met with considerable difficulty at times in cutting away the hind legs of a foal owing to the tenacity of the ligamentum teres and the pubio-femoral ligament. I find it a quick method to pass a long, straight-handled, blunt-pointed hook to the hip joint and to fix it around the trochanter major. I then cover the whole with my open hand to protect the uterus, and an assistant slowly turns the handle of the hook, thus wrenching the femur from its attachments.

Stenosis of the Os.—I have met with this condition a few times in cows, and also frequently in ewes.

The only recovery I have had after operative interference in the cow was in an old cow which everted a large portion of the gravid uterus before my arrival. The case was easily diagnosed, for the os was of a leathery character to the feel and when cut into proved gritty. I cut down cautiously through the ring until I considered I had gone through the altered tissues of the part, and could grasp the calf's feet, and then relied upon the laceration produced by the passage of the calf to widen the aperture. Having delivered a live calf, which was the chief motive of operating at all, the womb was returned and the vulva stitched, and the cow did well.

The same disease in ewes I have seen frequently, generally in old ewes which have had previous difficulty in lambing, and though operation is advisable to save the lambs and relieve the ewe, death has always followed in my experience.

Impervious Os.—Under this title is described a condition otherwise known as "white heifer disease," and persistent hymen, and it consists in the presence of fibrous tissue around and across the os uteri. I have never seen it except in primipara, nor in any whose colour was not either white, roan, or blue.

I think in this case, as in stenosis, that the knife should play a subordi-

nate part, and that laceration with the fingers after first nicking the parts with the knife effects the purpose more safely and with less hæmorrhage. In many of these cases it is wise after breaking down the actual new growth to wait for a time before attempting delivery. The reason for this is that the normal tissues surrounding the os uteri, having been pathologically held in a state of contraction by the diseased growth, have had no time or chance to partake in the general relaxation of the womb, and to attempt a forcible one may result in serious injury. Precaution should be taken to prevent eversion of the uterus after delivery, and the animal should be fed for the butcher.

Rupture of the Vagina.—I have seen this in cattle, usually due to the well-meant but too heroic efforts of the farmer or local quack to get up the hind legs in a breech presentation. A clean rent five or six inches long may be met with, and in my experience may do very well. In a very few hours a gelatinous gauze-like coagulum, probably of peritoneal origin, connects the lacerated edges, and if left severely alone and the treatment confined to controlling systemic disturbance a recovery may be looked for. Retention of the fœtal membranes in this case, however, leads to fatal septic peritonitis, and recovery is more likely when the accident occurs in heifers at first calf than in older animals.

Eversion of the Uterus.—I need not trouble you with many remarks concerning this common accident, but I should like to say that my first direction on receiving a message to attend such a case, or on arrival at the farm, is to see that the cow, if lying down, is secured by the nose and kept down. If standing up, the womb should of course be supported, but my point is that many cows die from the injury they do to the womb in the act of lying down. In their pain they may get up and lie down several times, and the swinging uterus often gets under the thighs and is crushed, death often following in a very short time from shock and hæmorrhage.

For the rest, all I have to say is that it is astonishing what a cow's womb will stand, and that one need never despair to put back a much bruised womb and give the cow a chance. I have seen a heifer whose uterus had, to the knowledge of the owner, been out for seven hours, the cow lying in snow; she was afterwards carted over a very rough road for nearly two miles, and being replaced, no trouble of any kind manifested itself. This case was very easily returned, and led me to try the use of cold water instead of hot, with the result that I consider it superior to hot, though the popular prejudice against it is a serious consideration. I believe that continued kneading and massage of the organ is more to the point than the amount or temperature of water used. In the mare the disease is much more fatal, but under favourable conditions a recovery may be expected in a large percentage of cases.

In cows and mares, after returning the womb, I consider it sufficient in order to prevent a recurrence to stitch through the labia of the vulva or across the buttocks, and to raise the flooring behind the animal, but reliance should not be placed upon the ordinary cow trusses.

The accident of "picking the reed" is one which affords many situations which may add to the gaiety not exactly of the nations, but may serve to lighten the daily routine of a hard-worked country veterinarian by an irresistible appeal to his sense of humour, whilst not being devoid of a certain serious value as illustrating the ignorance of his clients, or proving how far an experienced farmer may lose his head under certain circumstances. Upon

one occasion, obeying a hurried call to a cow supposed to be casting her womb, I found the farmer and three men sweating, cursing, and swearing in their attempts to prevent a vigorously straining cow from parting with a rather abnormally large afterbirth, and much moral suasion was required to induce them to allow the cow to have her own way.

Upon one occasion when obliged to be absent from home over-night, I left a "final year's" man in charge, and his last remark to me was, "You'll see now you are away something nasty will turn up." In the middle of the night there was a very urgent call, the message being that a cow had put her bowels out. My assistant dressed hurriedly, wondering meanwhile what had best to be done when a cow parted with her inside, and, as he confessed afterwards, sparing five minutes to peep into the index of several books with a forlorn hope of guidance. Arriving at the farm he was met by the "guidwife" of the house with "Come this way, sir, I have got them quite clean and keeping warm, sir." Confused, and worse confounded, my budding M.R.C.V.S. stooped to inspect the spurious bowels which were reposing in a blanket in a huge panmug and being assiduously bathed with warm buttermilk. Greatly doubting the evidence of his senses, my friend soon convinced himself of the risibility of the occasion, and, his own bowels shaking with mighty laughter, he proceeded to the shippon to find the cow, which had been greatly neglected, so that her bowels might be kept alive, placidly chewing the cud, apparently content with having parted with her fœtal membranes.

A rather more tragic ending followed in another case of misconception, where several dealers, used to cattle all their lives, held an ante-mortem inquest on a cow endeavouring to calve, but which they decided was passing her own bowels through the vulva. I was away on a journey, and, greatly dreading her speedy demise, they "cut her throat to save her life"—and the owner's pocket—but judge of how the latter wished to kick himself when, with the butcher's help, they found the poor cow had only been endeavouring to part with a celosmian monstrosity, and that the supposed entrails of the cow were those of the calf. You are not here, however, to hear stories, and I must not yield to the temptation to tell more, or I might keep you here longer than you bargained for.

Non-Dilatation of the Os.—False labour pains a fortnight or even more before due date of calving with a contracted condition of the os is often met with, and should be treated with chloral. The os, however, is occasionally found contracted when true labour is present, or it may be necessary to dilate the ring in several conditions met with independent of the parturient period. In the case of an animal in labour a good dose of chloral is of value, and in all cases where the os has to be dilated I find the best method to be the introduction of tampons of lint soaked in a 25 per cent. solution of cocaine. The first tampon is often very difficult to introduce, as the os is perhaps completely closed, and the attempt to screw in a very small roll of lint results in squeezing out all the cocaine solution, and in that case should be abortive. In such a case I find it answers well to thoroughly dry the uterus by the use of a sponge or pads of antiseptic wool, and having prepared the tampon of the required size and slightly moistened an inch or two of the end dip it into dry cocaine powder and screw it into the os. A 25 per cent. lanoline ointment of cocaine will answer almost as well smeared around the os, but the tampon acts more quickly where practicable. The first tampon may be removed in about an

hour, and manipulation with the fingers, after the manner of a glove stretcher, should be then resorted to in order that the second tampon soaked in cocaine solution may be as large as possible. The introduction of successive tampons of increased size together with finger practice should continue until the object is attained, but seldom are more than three attempts necessary, and I have found cocaine very superior to belladonna for this purpose.

In the mare it is of vital importance to observe the strictest antiseptic precautions whilst dilating the os, more especially if it is for the purpose of evacuating septic contents or fluids capable of becoming septic.

A little while ago I attended a mare said to be discharging at intervals from the vagina. A vaginal and rectal examination discovered the uterus enormously distended with semi-fluid contents but the os quite contracted. The animal was brought to my stables, and during the next day the os was dilated sufficiently to enable me to evacuate two stable bucketsful of what looked exactly like the mixed curds and whey familiar to cheese-makers. It appeared to be of a laudable character and quite free from any smell, offensive or otherwise. There still remained a considerable quantity of the material in the uterus, and with a view to further dilating the os a large tampon was fixed in the opening and the mare left for the night. In the morning the mare was found to be tympanitic, temperature 105, pulse rapid and wiry, and the patient very dull and off food. The os was completely dilated, the tampon in the uterus, and one and a half more buckets of the material were now removed, which had a distinctly sour or acid smell of a sickly character. No particular antiseptic precautions had up to now been taken, but the uterus was now irrigated with about 2 gallons of hot water containing lysol, which was partly evacuated by the mare herself and the rest removed by me after being in the uterus about fifteen minutes. After completely emptying the uterus about 6 ounces of lanoline containing 2 drachms of iodoform were introduced into the womb, a ball containing chloral ʒii., chinosol gr. 20 given every five hours, and the symptoms, which I attribute to the absorption of septic materials consequent upon the rapid decomposition of the morbid uterine contents after the admission of air, disappear in about twenty-four hours.

A sample of the material from the mare's womb was sent to the Dick College, and was described by the Professor who examined it as a very rich culture of a micrococcus, but no information could be given by him as to the origin or nature of the bulk of the fluid or its floating caseous constituent, and he discredited the suggestion hazarded by himself that it consisted of retained menstrual fluid. This mare had given birth to several foals, had been served the last season, and was supposed for three months to have held; when a slight discharge was noticed and continued for several months before I was consulted. No trace of an abortive fœtus could be found. In this connection I must mention an analogous condition which I have seen in cows after calving, and the description of a recent case will suffice. A cow, calved for the third time a week previously, went off her feed, and on examination I found her with a very rapid wiry pulse, no appetite, temperature 105, bowels very irregular and capricious,—some days a quantity of fœtid and fluid fæces would be passed, other days no motion at all. No straining or vaginal discharges, and a slight doughy swelling of the brisket with the above symptoms led me to suspect a case of traumatic pericarditis. The symptoms gradually subsided, appetite and

milk returned, and I so far dismissed the case as to say I would call if passing the next few days. I did so and was shown two great masses of caseous material of the shape of very big German sausages, but tapered at both ends, which the cow had passed from the womb that morning. They were pinky white in appearance, quite sweet to the smell, of the consistence of very new cheese, and their individual definite form proved that they had come one from each cornu of the uterus. I have seen the same condition on two other occasions, but in those cases there was ample evidence of uterine trouble, as there was straining and the passage of fragments of material, and in one case the mass removed after dilatation of the os weighed 8 pounds. All the cases were accompanied by great wasting, high fever in the early stages, capricious appetite, and irregularity of the bowels.

Under the microscope the substance removed was found to consist of a large proportion of amorphous material commingled with mucus cells, and my conclusion has been that it is a collection of the shed cells of the uterine mucous membrane mixed with the albuminous products of a catarrhal condition of the uterus. That there was going on a severe drain upon the system was proved by the very rapid wasting, the elevation of temperature is consistent with a catarrhal inflammation, and the product itself is of a character to indicate shedding of vast numbers of mucus cells and effusion of mucoid material.

Another condition of the vaginal and uterine mucous membrane generally seen following a difficult calving, or more often still after delivery of a calf which has laid dead *in utero* for some time, deserves mention here. I refer to that peculiar necrotic condition of the surface of the organ in which it attains a thickened and leathery feel, is generally dark brown or even black in colour, and if the animal lives gradually peels of in patches, and is usually accompanied by the presence of a thin watery and acrid-smelling discharge. It is often seen confined in the vaginal passage, especially where it is due to rough usage during calving, but I have often met with it after delivery of a putrid and emphysematous calf, the condition being established before delivery and due probably to necrosis of the mucous lining from the irritation of the effete contents.

The first of these two conditions of the uterus may be classified as a benign endometritis or uterine catarrh, whilst the latter affection may be considered as a septic or necrotic inflammation of the same layer of the organ. In both cases it is the mucous layer alone which is involved, but the inflammatory products differ vastly, and the variation is consistent with the difference in causation and the absence of septic infection, and an acrid or mechanical injury in what I have named the benign or catarrhal form. I shall refer to treatment presently.

Metritis.—Acute metritis involving the whole of the uterine tissue and extending to the peritoneum and even to the intestines themselves is seen in all our various patients, and is of two forms :—(1) that following direct injury to the organ ; (2) that of septic origin.

The first form follows injury during parturition, and most generally results upon an injury done around the os uteri or at any part of the uterus proper. Severe injuries may be inflicted upon the vaginal walls without the extension of inflammation to the uterus itself, but the nearer the injury is to the os the greater the danger of this happening. Where traumatic injury produces metritis it generally manifests itself in a few hours after and proceeds very rapidly to a fatal termination, and the greater the interval

between the injury and the appearance of symptoms the greater the hope of recovery. The coffee or chocolate coloured discharge found in septic metritis is described as occurring also in the traumatic form, but in my experience is rarely seen. If the injury take the form of a clean rent in the organ and there is no special septic source of infection present, such as retained fœtal membranes, then the course of the case is marked by the formation of true pus, and a recovery may follow with no change in the nature of this discharge. Many cases end fatally in so short a time from metro-peritonitis that there is not time for any discharge to be established, and I would venture the opinion not only that the chocolate-coloured discharge is characteristic of the septic form of metritis only, but also that it not always in itself proof of the existence of acute metritis.

Septic metritis is by far the most common form and has two prominent direct causes; the infliction of bruises, abrasion or scratches on the surface of the organ under septic conditions, and secondly, the retention of the fœtal membranes either with or without the existence of the above conditions. The general condition of the animal may act as a predisposing cause; for instance, I may point out that an animal exhausted by a long journey will be much more likely to develop it than one in full vigour at the time of calving. Retention of the fœtal membranes is in itself a sufficient cause, but less fatal than where injury also exists. I said a moment ago that the chocolate-coloured discharge is not always proof of acute metritis. In my experience true acute metro-peritonitis is a disease which either "ends or mends" with the cow and mare in a very short time, usually three days being the period of crisis. I have, however, seen cows suffering from a chocolate-coloured discharge for weeks together; no doubt some degree of metritis was present, but the discharge was identical in appearance and odour, yet the animals continued to eat, and, though much emaciated, often recovered. I consider that there is a fruitful field for some pathologist to investigate the precise nature of the various pathological uterine discharges and of the organisms which inhabit them and probably determine their character and effects.

This brings me to the subject of the retention of the fœtal membranes where the variety of discharges met with is most marked, and this is the only side of the subject I wish to touch upon.

The ordinary case of retained membranes is accompanied by a discharge consisting of broken-down blood, the débris of the membranes, and pus, is not very disagreeable in smell nor profuse in quantity, and after removal of the membranes becomes more laudable in character and less offensive day by day.

Another case will be characterised by a most foul-smelling discharge, thin, watery, and acrid, exceedingly irritant to the arms of the operator, producing a peculiar tingling sensation similar to that produced by aconite liniment and sometimes producing a nasty rash on one's skin. After removal of the membranes this discharge may persist in great quantity for a considerable time.

In a third case the discharge will be almost devoid of offensive odour but very profuse in quantity, of a greyish colour, and consisting of a thin fluid in which floats a finely divided flaky material, which, when the fluid is filtered, proves to be of a grey colour, and under the microscope amorphous, devoid of special cells or structure.

In yet another instance there will be found very little discharge beyond

a mixture of pus, blood and débris, but a number, or even the whole of the uterine cotyledons will be found necrosed and come away with the fœtal membranes.

There are other varieties and modifications of these particular conditions met with, but you will no doubt be familiar with them.

Now so far as I can discover these variations do not follow or depend upon infection from extrinsic sources, for if we take a number of cases where the cow has calved naturally and no operator's hand has been introduced we find the variety of conditions I have named. Do these varying discharges depend upon systemic causes—the condition of the animal, the state of the weather, the length of time the membranes have been retained, or are they due to variations in the organisms present.

With respect to the treatment of all cases where a septic uterine discharge is present after removal of the membranes, where established independent of their retention, or following such a case as prolapse of the organ, I wish to ask your careful consideration.

The aim of us all, I take it, in such cases is to destroy the septic organisms present with as little irritation of the organ as possible, to restore tone to the uterine muscle that it may undergo the normal contraction following parturition, and to restore tone also to the mucous membrane so that it may cease to produce morbid discharges.

My own method used to be to inject or gravitate into the uterus large quantities of warm solutions of antiseptics, such as solutions of creolin, chinosol, lysol, carbolic acid, &c., and to leave them there, and in the vast majority of cases this answered the purpose. Nevertheless I consider this method to be bad practice. The presence of a large quantity of fluid prevents the normal contraction of the uterus ; in most cases after removal of the fœtal membranes the os contracts rapidly and the fluid becomes imprisoned. Under such circumstances, no matter what is the antiseptic which has been used, the germs get the upper hand, and in a few hours flourish amazingly, and our injection is found to have been transformed into a stinking liquid which proves a menace to the animal's health or even life. My own practice is, where the uterus can be reached, to thoroughly flush it out with a very weak hot antiseptic solution tube, and then to immediately remove all fluid with a sponge or antiseptic pledgets, and then introduce about six ounces of an ointment consisting of lanoline or *real* vaseline in which is *dissolved* a drachm of iodoform. I use the adjective real as applied to vaseline because most of the so-called veterinary petroleum jellies and cheap petroleum products are not vaseline at all, and, worse still, they possess very decided irritating properties. Iodoform may not merely be mixed with lanoline or vaseline, but is soluble in them, and may be made if required at once by using gentle heat and stirring in the iodoform as the medium sets, or if used for stock may be relied upon to dissolve in either.

My argument is that an antiseptic introduced in the greasy form remains in the uterus, is of the least possible bulk, is rapidly absorbed, is non-irritant but rather emollient in character, and does not afford a nidus for the propagation of septic organisms.

One is sometimes called to cases both in cows and mares where the uterus is filled with septic fluid and where the os is so contracted that it is impossible to introduce the hand. In all such cases I consider it to be of vital importance to evacuate the fluid contents entirely, so that the uterus may contract and cleanse itself. For this purpose I have had made a

magnified sort of enema syringe with a very long suction tube, which is guarded against the admission of débris by a fine wire gauze. I introduce this through the os, and pump out the uterine contents, afterwards passing my miniature probang and pouring in my iodoform ointment, previously liquefied by heat, repeating the process next day if more fluid has collected. Treatment carried out upon this principle I have found by far the most successful in dealing with all septic conditions of the uterus in all patients, and I can strongly recommend it.

Now, gentlemen, I am afraid my discourse, like that of some preachers, has long outstayed its welcome, and though there is much left unsaid I must close, hoping you will find something of interest therein worthy of discussion.

NOTES ON ABDOMINAL PAIN AND ITS TREATMENT.[1]

BY J. CLARKSON, M.R.C.V.S., GARFORTH.

My excuse for choosing a subject so wide and one to which I can do such scant justice, is its great practical importance to us in our everyday work. I know of no other. with the possible exception of influenza, to which our services are so frequently requisitioned, and certainly none which offers such immense difficulties in its diagnosis. I do not mean that abdominal pain is difficult to diagnose, but the exact condition giving rise to it is especially so—in fact I believe absolutely impossible in the light of our present-day knowledge, and it is only by exchanging experiences and comparing notes that we may hope for improvement in the future.

Abdominal pain may arise from many diseases of the gastric and intestinal tract, mainly but not invariably caused by errors of diet or parasites and from diseases of the various other organs contained in the abdomen, such as the liver, kidneys, bladder, &c., conditions which are too numerous to particularise in the time at our disposal. I do not propose to consider the—shall I say ?—general symptoms, symptoms common to almost all forms of abdominal pain, but I should like if possible to bring out in the discussion the special, constant, or diagnostic symptom of any particular form of abdominal lesions which may have been noted, and to bring the paper within bounds I will merely indicate several points which seem to me interesting and very debateable, and one on which I should like confirmation or correction.

Commencing with the stomach in gastric tympanitis, there is, in addition to the eructations of gas, usually great difficulty in exhibiting fluid medicines and very often an interval of increased pain after their exhibition. If actual eructations are not present there is a very decided bubbling sound on listening at the horse's breast. I have thought sometimes there is a characteristic hugging of the ground when the horse is down in gastric impaction, and though cerebral symptoms are generally described as being present I have not found it so.

Vomition is not invariably present in rupture of the stomach, and when present is not always diagnostic of this lesion. I have seen it in rupture of the colon. A peculiar quick, jerky form of pain difficult to describe has in a few instances seemed referable to the small intestines. Great dilatation

[1] Read at the Annual Meeting of the South Durham and North Yorkshire Veterinary Medical Association on 12th Sept. 1902.

of the rectum (ballowing) and the desire to press backwards is often present in impaction of the colon. Sighing, in addition to prostration, pallid mucous membranes, &c., is often present in rupture of an organ. Apoplexy of the bowels is often discovered on puncturing to relieve the almost invariably attendant tympanitis, by the escape of disorganised blood from the lumen of the bowel through the canula.

Patchy perspirations I have not found reliable aids to diagnosis, a remark which may be extended to the various positions assumed by the patient and to the place a horse appears to indicate when looking back at his side or sides.

Biliary colic, except in fatal ruptures and other grave cases, is often characterised by dulness, and protracted uneasiness more than violent pain. Absolute loathing of food, coated and discoloured and fœtid fæces, with yellowness of mucous membranes later on, small ruptures of liver tissue and not involving the capsule, are of fairly frequent occurrence. Renal colic is generally of a violent nature, and characterised by frequent attempts at stretching, and groaning, but its exact nature can only be determined by rectal examination of the bladder.

I can indicate no symptoms by which we can determine whether the patient is suffering from either one or other of the following: intestinal calculus, volvulus, intussusception, mesenteric hernia, and enteritis.

Coming to treatment, the first question which arises is, Is a purgative indicated? Personally, I think very seldom. In simple cases of colic, the exhibition of a purgative which takes some time to operate, though safe, seems to me a waste of time, necessitating as it does the animal playing for one or two days, whereas most animals treated with a stimulant combined with carminatives are ready for work the following day. But many cases which apparently commence as simple colic develop much graver symptoms, and then often a purgative such as aloes has done incalculable harm. In cases of impaction of the stomach where the bowels are healthy, such a case in fact as would in human practice be relieved by vomition, I regard as the ones suitable for an aloetic purgative, but where the pain is referable to the intestines, purgatives are better withheld.

I believe we have a larger number of cases caused by aneurism of the anterior mesenteric artery than is generally imagined, and that many cases of recurrent colic are due to this cause. The first attack is not of necessity the fatal one, but by portions of the thrombus becoming detached and being carried as emboli to form plugs in the small vessels of the cæcum and colon, that portion of the bowel wall supplied by the vessel is rendered anæmic with diminished or lost peristalsis and stasis of its contents. Here, as in enteritis, where the function is entirely lost, in intestinal calculi, volvulus, intussusception, &c., a purgative is contra-indicated. Where aloes is deemed inadvisable oil is often used, being considered milder and safer, but I think oil has many faults. I regard it as slow and uncertain in its action as a purgative, and when used as a vehicle it interferes with the rapid absorption and reflex action of the more active remedies with which it is exhibited and greatly retards their action. My experience is that I can get a prompter and more powerful action from anodynes and antispasmodic if oil is not used. I had one case in particular which had been liberally dosed with oil before I was called in, and though the case lasted four days before recovery took place I was never able to get satisfactory action from medicines given by the mouth, but immediate relief followed hypodermic in-

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jections. In cases of irritant poisoning oil is one of the standard remedies to prevent absorption of the poison still remaining in the alimentary canal, as well as to sheath and protect the mucous membrane, and a remedy which does this must, I think, limit absorption.

Post-mortem examination often reveals huge quantities of unabsorbed medicine in the stomach of horses where oil has been used as the vehicle or purgative, and particularly of the medicaments soluble in oil. The spirits of tinctures, &c., being only loosely mixed and easily separable, are not perhaps prevented from acting to the same degree.

In speaking of simple colic before I mentioned the use of stimulants and carminatives. These are usually sufficient without anodynes, but if the pain is very severe then anodynes become necessary. And though it has been somewhat under a cloud latterly I think opium in one of its forms is still the best. No drug in the pharmacopœia has the same power of paralysing the bowel by stimulation of the splanchnics as is possessed by opium, whether given hypodermically or by the mouth, an action which is absolutely essential in the treatment of many of the conditions we are considering. The sensory centres and the different nerves (including the sensory) of all organs are depressed, and the functions of the sensory nerve terminations are lowered or arrested, rendering the transmission and perception of painful impressions difficult. But very large doses (as one often hears of being given), by paralysing the splanchnics, induce peristalsis and stimulate the cord, giving rise to symptoms which, following on a case of abdominal pain, may easily mislead. Dr. Harley in Dun's *Materia Medica* thus describes the toxic symptoms:—"That the spinal cord is implicated appears to be indicated by the rhythmical character of the movements, the horse scrapes the ground for hours together, begins and ends with a regular tread from side to side, or goes round and round continuously in the same direction. There is an evident tendency to forward movement, together with inaction of the hind legs." I have often seen cases quoted where 8 and 12 grains of morphia have been exhibited hypodermically, followed by smaller doses at intervals. I consider these far too large, and I seldom fail in getting anodynes and hypnotic action by grs. ij. or iij. with little or no excitation. The hypodermic method is as a rule best, one gets an accuracy of dosage—impossible when given by the mouth—and uncomplicated and rapid action, an action which can be maintained for a considerable time by repeated moderate doses.

Many practitioners combine atropia with morphia, and it is an excellent combination, the atropia correcting the liability to derange digestion possessed by morphia. In cases of obstruction of the bowels I find the solid opium given as a bolus, combined with ammonia carb. and carminatives in the shape of the essential oils. I generally used the mixed oils of cloves, peppermint, and cajeput (if tympanitis is present) answers perhaps better than the tincture, or if it is desirable to push its use still further, a combination of opium, belladona, and chloral hydrate forms an excellent anodyne. Cannabis indica is another anodyne which has found much favour, but I cannot allow it the superiority over opium rightly used which is sometimes claimed for it.

In cases characterised by tympanitis the essential oils, ammonia, ether, and chloroform, or carbolic acid, are all extremely useful combined if necessary with the opiate. Turpentine is one of the favourite remedies in this disease and an excellent anti-tympanitic and anti-spasmodic it is, but

the same action can be obtained by the use of the essential oils with none of the ill effects on the urinary tract which commonly follow the use of turpentine. In diarrhœa attended with tympanitis carbolic acid of glycerine is most effective combined with an opiate if much pain is present. In protracted cases of obstruction due to atony with little or no pain, after the first day or so carbonate of ammonia, and nux vomica as a stimulant and tonic to the muscular coat of the bowel, is useful. Often in these cases one is tempted to force matters by giving a purgative, but it is seldom wise, particularly in old horses. If time is allowed, recovery, though protracted, is almost certain.

There are still two remedies I have not yet mentioned—barium chloride and eserine. The former is, I think, too violent in its action to be used with safety. Eserine in $\frac{3}{4}$ to gr. j. doses injected hypodermically or intravenously is also extremely rapid in its action and should only be used after careful consideration. and not at all to old horses, which usually have very thin intestinal walls, or rupture may be caused. Though I seldom use aloes I do sometimes use eserine, though I treat it with the greatest respect —which seems somewhat contradictory, but you have in eserine, by the rapidity of its action, a diagnostic agent of no mean value, which is not the case with slower acting aloes. If in, say, half an hour after hypodermic, or preferably intravenous, injections no result has taken place—that is, no fæces or flatus have been passed, the pain will be immensely increased, you may with certainty regard your case as hopeless, and you will probably have hastened the end. Pilocarpine in 2 or 3 gr. doses is often combined with eserine, and it assists and perhaps lessens the danger by throwing out a quantity of fluid into the intestines.

In the external treatment of abdominal pain I prefer fomentations and friction with local anodynes, such as solutions of opium or belladonna, to counter-irritation. In the surgical and mechanical treatments, bleeding has fallen much into disuse, probably as a reaction from the indiscriminate bleeding practised without rhyme or reason by our predecessors, but in protracted cases the abstraction of a moderate quantity of blood often gives a remarkable amount of ease. In every case of abdominal pain the rectum should be emptied and as thorough an exploration made as possible. So much may be discovered in this way—the condition of the mucous membrane of the rectum itself, of the colon, the bladder in the horse, the prostate glands, the position of the animal during the exploration, &c. &c., all help, perhaps, in making an accurate diagnosis. Enemas are most helpful, and should be employed in the majority of cases. I do not like the force-pump so often employed, the animal so often strains against it. I prefer gravitation, but not the ordinary Gamgee funnel; I use an ordinary funnel, and as long an indiarubber tube as circumstances will allow. By this means, which gives the strong angular gentle pressure of a long column of water, a larger quantity can generally be introduced than by the intermittent force of a pump.

Anodyne enemas are invaluable, and I rarely pass the catheter until I have tried the effect of an anodyne enema, except perhaps in the mare. Anodyne suppositories may be classed under the same heading, often giving an immense amount of relief. In cases accompanied by tympanitis it is often necessary to give relief by puncturing before medicines have time to act, or even in some cases to be administered, and I am very strongly in favour of doing so early—not allowing the patient to become exhausted

or almost dead before operating. I cannot call to mind a single case where harm has followed puncturing—using always as thorough antiseptic pre cautions as possible—and I have punctured largely whenever and wherever it has seemed necessary, in both flanks, near the linea alba or through the rectum.

Does rolling give rise to volvulus? I do not say this is impossible, but I think it seldom occurs. I generally allow the animal to have much of his own way in the matter—he is the best judge of the position which gives him the most ease—though no fixed rule can be given. If an animal is tympanitic, particularly in gastric tympanitis, I endeavour to keep him on his feet on account of the danger of rupture of the distended organ, though even here the animal seldom throws himself down violently. I should have mentioned before the utility of auscultation of the abdomen, and at the same time have pointed out how easy it is to be misled by the bowel sounds.

DISCUSSION.

The PRESIDENT said they had had a most interesting paper on a subject which was occurring almost every day in their practice.

Mr. TAYLOR agreed that it was a most practical paper. Mr. Clarkson appeared to appreciate the difficulty they all had in diagnosing cases. They got a case of twist, and then perhaps death ensued in twelve hours, whilst one had known a well-marked twist last for three days and all the time there was no indication of anything so seriously wrong. It was slow pain that one found in a twist as a rule. With regard to calculus they didn't get so many cases as they used to do. In towns, however, they were quite common, and where he was in practice in Manchester they used to get a great many, and they were difficult to diagnose. You might get early deaths and in others lingering on for a considerable time. He heard of one the other day that lasted for three weeks. The horse obtained a deal of relief from treatment but the whole symptoms presented themselves again, and on a post-mortem being made three large calculi were found. He thought they could diagnose a case of rupture of the stomach very well. You got sickness and food coming down the nostrils. In enteritis it was difficult to know when a case had commenced, but if they came to a case where they had clammy sweats, haggard expression, hurried breathing, and the inclination to lie down that was so well known to them all, they could depend upon it they had enteritis pretty well marked. As regards treatment, he agreed with Mr. Clarkson, and he thought a great many cases were lost through not puncturing early. He knew a case where an animal came off a journey tremendously distended. It was eructating gas and he could get practically nothing down. He let out an enormous quantity of wind and she got relief almost immediately, and in an hour or two afterwards he was able to give her medicine. There was no difficulty in taking antiseptic precautions, because they could always get some boiling water to cleanse their trocar. With reference to giving aloes, he thought if one could not get relief after giving a couple of colic draughts, the best thing was to give a dose of aloes, because if you didn't you would find the pain continue. In an ordinary case of impaction of the bowels the better plan was to give the aloes straight away. As regards fomentation he considered it of great benefit, but in the country they could not manage so well as in the towns. With reference to oil he didn't like it at all. It was most nauseating, and especially in cattle. It was also very unreliable, one couldn't

depend upon its action at all, and he thought it was an agent that ought not to be adopted. With reference to hypodermics, they were of great value indeed and ought to be largely used. Referring to eserine, he got rather disgusted with it at Manchester, for he got little result, and he had not used it for some time. A friend of his, however, told him of a case he had of impaction of the stomach and the animal got into a frightful state. His friend resorted to bleeding, but that gave no rellef, and he then gave the animal eserine. This gave action of the bowels and the horse never looked back. Mr. Clarkson had not mentioned chlorodyne. He preferred it before opium because the latter was very nauseating.

Mr. SNAITH said the paper had interested him very much, especially as he had a case under treatment just now. The previous Sunday he was called to see a big cart horse which was suffering from abdominal pain. He was informed she had had two colic mixtures, and the animal had also been given linseed oil. He didn't give a very promising diagnosis because the pulse was small and weak and the horse was in great distress, and cold in certain of the extremities. After administering morphia hypodermically and some medicine he returned on Monday. The pain had subsided to a large extent but the bowels had never been moved. He administered further physic but did not succeed in getting the bowels opened until the Wednesday, and never to a large extent. There was then no inclination to feed. When he examined the animal on the Monday the temperature had gone up to 105, and on Tuesday it was 106, and the animal was shaking. They wrapt him up and he (the speaker) came to the conclusion that the horse had had a chill and inflammation of the lungs had set in. On Wednesday the temperature had gone down to 104, and on Thursday the animal again showed abdominal pain, although the temperature was still falling. One indication that he was suffering from abdominal pain was that the animal got up much the same as a greyhound dog and stretched himself to his full extent, and then went back as far as he could without overbalancing himself. The bowels had not been moved for two days, and the animal was at that time in the same position. With regard to calculus, he was away a short time ago and on returning found an old mare suffering from an injury to the foot. As the mare could neither rest lying, or in the slings, or standing—she was suffering extreme pain—he advised that she be destroyed, as she was only wearing herself out. A few days afterwards he was told she had a couple of hundred stones in her of varying size. He got about three dozen of them, some of which he produced.

Mr. DUDGEON said that for the last twenty-five years he had been trying to get diagnostic symptoms of bowel diseases, but like most other people he had failed. He had thought certain things in reference to certain cases, but his next post-mortem had upset the theory altogether. Where you had a gastric disturbance the patient was more inclined to lie with his feet out or with his feet underneath him, whereas where you have the trouble in the intestines they put themselves in all positions. In serious cases of bowel complaints there are few surgeons who would say that such and such a lesion was there. You know the bowels are diseased, and you may think there's a twist, and when your patient dies your post-mortem examination disappointed you. Many years ago he was called to a case in a big hurry. He saw the pony sitting on its haunches with his fore feet planted fairly straight out, vomiting as he had never seen an animal vomit since. When he got there next morning the animal was all right, and it lived for some

years afterwards and had no medicine.—(Laughter.) In the majority of cases of ruptured stomach he had seen no vomition. He thought the bowels were a great guide, especially in cases one had to watch, and he agreed that it was not necessary, in at least two-thirds of the bowel complaints, to give physic immediately. In fact he was getting chary of giving physic. He wanted to know how the case was going to turn before administering physic. In conclusion he said Mr. Clarkston's paper was of the practical sort, which was of the greatest benefit to a Society like theirs.

Mr. HILL said that the last few years he had been disgusted with linseed oil as a purgative. It seemed so uncertain and the animal seemed nauseated after it. One symptom had been mentioned characteristic of stomach impaction, and that was hugging the ground. In raising himself from the ground the animal puts all the weight he can upon his chest. He was called to a good draught mare which had been in pain some six or seven hours. Her bowels and temperature were normal, and there was little pain when he saw her. He examined the rectum and he thought the animal had a twist. The mare died an hour after he left. He made a post-mortem and found there was a twist. A case of calculus had been mentioned. He had a case where he found the calculus 10 lb. in weight. The animal died of septic pneumonia.

Mr. WILSON said that in twist of the bowels he had noticed in every case when he had been there in time that there had been a sort of involuntary twitch. He didn't say it would be noticeable some hours afterwards. In two cases of tuberculosis of the spleen he had noticed the rolling referred to.

Mr. FORBES said that in two cases of twist he had had recently there had been vomition, and in one there was a rupture of the colon. In both instances the vomition had following the use of eserine. His idea was to give aloes at the very commencement. The diagnosis of abdominal pain seemed to be a difficulty with most of them, and he knew it was with him.

Mr. DOBBING said he agreed with the remarks of Mr. Clarkson as to the use of the hypodermic. He believed in the early use of the trocar when there was a distended bowel. Linseed oil he thought very obnoxious, and never used it.

Mr. AWDE remarked that no practitioner was long in practice before he experienced bowel cases, and the closer one looked at those cases the more complex they appeared. His experience had been that one formed conclusions as to what was the matter and the best mode of treatment, and the post-mortem usually revealed an extremely different condition of affairs. When he first went into practice linseed oil was used as a purgative, but he had given it up long since. He had never found any bad effect from aloes. He had pushed the use of eserine for all it was worth, but had met with no success. He believed you could get a rupture from its use, particularly in old animals. With regard to vomition he had noticed a horse vomit frequently in cases of flatulence. He knew no anodyne better than chlorodyne, and that he used for bowel troubles.

The PRESIDENT said he believed when eserine was used it should be given some time after opium.

Mr. CLARKSON, in reply, said he quite agreed that horses having cases of twist were in violent pain early on, but then there was simply a gradual sinking away. With regard to ruptured stomach, he had said that vomition was a diagnostic sign, but he agreed you could have vomition without

ruptured stomach. The theory with regard to ruptured stomach was in question. One set of authorities seemed to think the rupture took place through vomition owing to the violent exercise, and another section from other causes. With regard to linseed oil he was glad to hear so many of the members agreed with him; he was rather in favour of opium taking the precedence of chlorodyne. As far as the use of eserine was concerned he agreed that it was dangerous to give it to old horses, for he didn't hesitate to say that it had caused a large number of ruptures.

ANNUAL REPORT OF THE IMPERIAL BACTERIOLOGIST FOR INDIA FOR THE YEAR 1901-1902.

THE Annual Report of the Imperial Bacteriologist for India (Dr. Lingard) for 1901-1902 is just published. On perusal we find that Dr. Lingard and his staff have been extremely busy during the past year in preparing anti-rinderpest serum, of which 50,000 doses were prepared.

The Department also developed methods for the preparation of anti-anthrax serum.

"*Anthrax.*—The opinions expressed by me in the concluding portion of my letter No. 526, dated the 29th August 1900, with regard to the preparation of a serum for anthrax and anthracoid diseases, were approved of by the Viceroy in Council, as referred to in Government of India, Revenue and Agricultural Department, No. 54 of 1900, dated 4th October 1900, to Her Majesty's Secretary of State for India. Consequently, during 1900-1901, experiments were taken in hand with a view to the preparation of a protective serum against anthrax, which has been further developed and brought to a successful issue during the year under review.

"14. The mode of procedure adopted for the purpose of immunising animals was similar to that utilised in the case of rinderpest, except that enormous quantities of anthrax material had to be prepared in bouillon, and cultivated in the incubator for several days, and later injected subcutaneously, instead of the injection of virulent blood as in rinderpest. The other details with regard to repeated injections at intervals are somewhat similar to those used in the preparation of anti-rinderpest serum.

"15. From the date on which the initial experiments for the purpose of protecting the selected animal against anthrax, to the date of the first bleeding, for the purpose of collecting the serum, a period of from four to five months must elapse, and even then only one bleeding can be effected, and another injection of virulent anthrax cultivation has to be made in order that a subsequent bleeding may follow. As the experiments progress it is hoped that a shorter period will be required to produce a more highly efficient serum.

"16. In the preparation of a protective anthrax serum, plains and hill cattle, and in addition, buffaloes, have been utilised for the purpose. Our researches have elucidated the following important facts amongst others:—

"(*i.*) The inoculated disease in this country runs a course in plains animals of from 70 to 144 hours, and in hill cattle from 35 to 120 hours.

"(*ii.*) The hill breed of cattle, as in the case of rinderpest, is much more susceptible to anthrax than the plains, and it has been observed that a weak culture of the bacillus anthracis, which

had no effect on several plains animals, readily brought about a fatal result in the more susceptible breed, viz., Himalayan cattle, as well as in equines, sheep, and goats.

" (*iii.*) With regard to the protective power exercised by the anti-anthrax serum manufactured up to the present, it has been proved that plains animals, of about 300 to 400 lbs. and over two years of age, require a dose of 10 c.c., whilst the hill breed of animals, 150 to 200 lbs. in body weight, require a dose of 50 c.c. that is, the small Himalayan cattle must receive at least five times the dose given to plains breeds.

" (*iv.*) It is a point of great importance, however, to remember that young cattle under two years of age require a much larger dose of this protective serum than adult animals of the same species."

Further information is given in the Report regarding epizootic lymphangitis, of surra, and of paralysis in horses, all of which diseases are unknown as epizootics in Great Britain.

" 17. *Lymphangitis Epizootica.*—During the year under review, 134 specimens of tissues and pus taken from suspected animals were received at the laboratory from different localities dotted over India, for examination and report. Of the total number of specimens, 70, or 52 per cent., were found to contain the cryptococcus of lymphangitis epizootica, and in 64, or 47·8 per cent., the organism was absent.

" 18. Through the courtesy of the Director, Army Remount Department, I was enabled, on 25th March 1900, to initiate a number of comparative experiments in equines, bovines, buffaloes, sheep and goats, with a view to determine to what extent these animals were susceptible to lymphangitis epizootica when subcutaneously inoculated with fresh material just collected from a recent case. On the 27th March 1902, after a period of over two years, and at the request of the Director, Army Remount Department, I determined to destroy the experimental animals in order to find out whether any of them had lesions in their internal organs. A few weeks after the primary inoculation of the lymphangitis epizootica material containing the cryptococcus, considerable lesions were noted in the horses and mules, and ones of a slighter character, beneath the skin at or around the seat of inoculation, in the bovines; the "materies morbi" of this disease being frequently recognised by the microscope in the affected tissues. After an interval of 1 year and 9 months, at which date the animals were destroyed and the post-mortems conducted, no trace of the inoculated disease could be found and no lesions of the internal organs referable to the same were observed.

" 19. In conjunction with Veterinary Captain Cranfurd, Army Veterinary Department, experiments were undertaken to ascertain whether horses could contract the above-mentioned disease when "mutty" obtained from the standings of diseased animals was applied to the surface of granulating wounds. Three animals (equines) were used for these experiments.

" In the first experiment, the "mutty" was taken from the just vacated standing of a bad case of lymphangitis epizootica, and the result was positive. In the second and third, certain selected standings, previously occupied by severe cases of the above disease, were railed in and allowed to be exposed to the weather during a period of two months before the material was collected and smeared on the granulating surfaces. The

granulating wounds were cleaned and smeared daily with "mutty" obtained from the above source between 30th July and 7th September 1901. Although the second and third cases remained under daily observation for a period of eight months, no outward symptoms resulted and no lymphangitis epizootica supervened.

"20. Lymphangitis epizootica has now become a generalised disease in many districts in India. On investigatiug the outbreaks at Hapur and Karnal Remount Depôts in 1900 affecting horses and mules, I traced the disease to previous cases imported from Italy, but in no way connected one with the other. During my visit to Hapur, 27th March 1902, I found two animals segregated in the confines of the depôt, only received from Lahore and Jacobabad fairs within a period of three weeks, the former to be suffering with well-marked lymphangitis epizootica, in the tissues of which the cryptococcus was demonstrated microscopically, and the latter presented every symptom of an early case.

"21. *Surra.*—Researches with regard to this absolutely fatal disease in equines has been continued during the year under review. There is not much to note with the exception that a serum was prepared which possessed a power of destroying "in vitrio" the trypanosoma of surra in two and a half minutes, and the trypanosoma in control specimens still survived after a period of six or seven hours. Even in equines suffering from surra, subcutaneously and intravenously injected with this strong serum, the tendency was always for the trypanosoma to return after an interval of days, and the serum was therefore of but very little value. From such serum, it is feared, no hope of success can be entertained, and for this reason modifications will have to be introduced and other lines of research entered upon, especially when the Bareilly Depôt is complete and work commences there.

"24. *Paralysis.*—On the Director, Army Remount Department, wiring concerning severe outbreak of paralysis affecting equines at Karnal Remount Depôt, I was ordered by the Secretary to Government, Revenue and Agricultural Department, telegram No. 4047, to proceed to Karnal immediately. On arrival every endeavour was made to determine the cause of the outbreak principally amongst Australian remounts. The disease was observed to follow three different courses, *i.e.*, an acute, semi-acute, and chronic form. Most of our investigations were confined to the two latter, as the cases of the former were uncommon. Twenty-two autopsies were conducted, and experimental inoculations performed on equines, bovines, sheep, and goats. Further, investigations were made with regard to the water and fodder supply, and the services of the Superintendent, Saharanpur Botanical Garden, were requisitioned as to the different diseases of the fodder crops, and complete specimens of the latter were forwarded to the Cryptogamic Botanist to the Government of India for examination and report. Much new light has been thrown on the causation of this disease, but as the question is of a most abstruse character, much close attention and observation is required to solve the problem, which will be continued as opportunity offers. The Director, Army Remount Department, has been requested to initiate certain experiments this season at Karnal in order to elucidate whether the well water is at fault."

The whole Report is most interesting and instructive, and indicates unbounded zeal and energy on the part of the imperial bacteriologist to elucidate the cause and discover the cure of many of the pests that ravage the domesticated animals in India.

POISONING IN ANIMALS.[1]

BY VET. LIEUT.-COL. J. A. NUNN, C.I.E., D.S.O., F.R.C.V.S.

In most cases of sudden or unusual deaths, especially if the victim is a dog or small pet animal, suspicion is aroused of poison, either accidental or malicious, and the owner often resolves on having an analysis made. It frequently happens that the post-mortem in the case of the larger animals is performed by the owner himself, or the knacker, and with dogs and small ones by the gamekeeper, groom, or handy man. The making of a post-mortem examination for forensic purposes so that reliable evidence may be given before a court is one in which skill has to be exercised, and even in collecting the viscera for analysis the crude efforts of the amateur may through ignorance completely frustrate the chemist.

The public have but little idea of the technique of an analysis, but when it is remembered that many poisons after they enter the stomach are completely destroyed by the action of the gastric fluids before they act, that by various processes, such as distillation, burning, and chemical reagents, they have to be separated from the tissues often in a totally changed form, it will be understood that any accidental contamination of the substances to be examined may cause a misleading or negative result. This is especially the case with some of the alkaloids, such as strychnia and morphia, and it also, though for different reasons, applies to volatile poisons, such as chloroform, ammonia, and hydrocyanic acid.

An analysis for an unknown poison is a long and complicated process, and if when the viscera are forwarded some indication can be given as to what is suspected, the analyst can test for this particular poison or group of poisons alone, thereby saving himself much time and trouble and his client some expense. A few simple rules if observed will much facilitate all this. On opening the stomach or intestines notice if there are any white fumes or a smell of garlic given off, which will indicate the presence of phosphorous, an ingredient of many of the rat and beetle pastes sold. There may be seen, if the examination is made immediately after death, and if there is a large quantity present and the material is brought into a dark place, in some cases the well-known phosphorescent light may be given off. If the different viscera are separately packed in the manner to be described no harm is done by opening them. In fact, an intelligent observer will be able to give valuable evidence by noting their appearance in the fresh state. If, however, there is any difficulty in disposing of them, or if two or more organs have to be put into the same receptacle, they should be left intact.

If they are opened the folds and pockets should be carefully examined to see if there are any pieces of solid substances collected in them, such as portions of matches, solid particles of arsenic, corrosive sublimate, oxide of mercury, or red iodide of mercury, scales of cantharides; husks and hairs of seeds, such as nox vomica, may be also detected and throw much light on an obscure case. A case of poisoning camels with oleander in Northern India was detected in this manner and the culprits brought to justice.

Such substances should be carefully picked out, separated, put into clean *new* pill-boxes and carefully labelled where they have been taken from. They can then be separately examined and may at once confirm

[1] Read at a Meeting of the Southern Counties Veterinary Medical Association, on 9th October 1902.

the suspicions of any suspected poison. The colour of the contents of the stomach and intestines should be noted. Salts of copper will give a blue or green. Indigo, which is used to colour rat paste, a dark blue, and picric acid a yellow colour.

The smell may give valuable assistance, and for this reason the examination should be made as soon after death as possible. Most persons are aware of the odour of chloroform, iodoform, alcohol, ether, carbolic, and acetic acids, nicotine, iodine, and sulphurretted hydrogen, which has the characteristic smell of bad eggs.

Several glass jars should be provided, if possible new. They should be thoroughly washed out with dilute hydrochloric acid and afterwards with spirits of wine and allowed to dry. French prune or wide-mouthed pickle bottles answer well for small animals, but earthenware ones are objectionable on account of the lead in the glazing. Sealing wax, a seal, parchment paper, and *new* tight-fitting bung corks are required.

The body, if that of a small animal, should be opened on a clean table or plank. If that of a large one, it should be pulled on to a pavement which has previously been sluiced down with clean water, or if this is not practicable some *clean* planks should be placed beside it to receive the viscera when the abdomen is opened. The stomach and intestines should always be opened outside, never inside the body, and before the former is removed a string should be tied round the œsophagus and two round the small intestines where they join the stomach, a couple of inches apart. The œsophagus should be divided above the single ligature and the intestine between the double ones; by this means the contents will be prevented from escaping. The stomach should be placed in a jar labelled No. 1, with the contents if it has been opened, and at once sealed up. The small and large intestines should be separated and each placed in a different jar, Nos. 2 and 3. A double ligature should be tied round the small intestine where it joins the large and cut between them, another ligature should be tied round the rectum before it is cut.

If necessary, the œsophagus and pharynx may be removed and placed with the stomach. The liver, or a portion of it, and some of the blood which can be obtained from one of the large vessels or the heart should be placed in jar No. 4. In cases of suspected poisoning by carbonic oxide gas from charcoal fumes the blood should be collected separately in a small bottle which has been previously cleaned in the same way as the jars, and closed with a new cork. Such cases, however, are not common in veterinary practice.

The lungs, or a portion of them, and some of the muscles should be packed in jars 5 and 6. Of the latter about 1 lb. weight will be sufficient taken in proportion from the thighs, side of the chest, and diaphragm.

The kidneys and bladder can be put together in jar No. 7, but a tight ligature must be put round the neck of the latter to preserve its contents, and in jar No. 8 the brain and spinal cord. The corks should fit tightly and be covered with a sheet of parchment paper tied round the neck, the knot of which should be sealed. Each jar should be labelled stating the contents and the date and hour removed from the body. The knot attaching the label should also be sealed.

Any suspected food or dejecta—particularly the latter—should in like manner be placed in separate sealed vessels, and any medicines be sealed up in the packets or bottles in which found.

It is not advisable to bring disinfectants into contact with the body, on account of the danger of the introduction of extraneous substances, and for the same reason the organs should not be placed in alcohol, which alters the composition of many poisons and renders their detection difficult, especially in the case of phosphorous.

These directions may seem somewhat complicated, but are not in reality, only a little method which well repays the extra trouble being required to carry them out. In veterinary practice it is in the vast majority of cases small animals—pets—that are the subjects of such inquiries, and my experience of such is that there is generally much feeling and resentment on the part of the owner, who is willing to go to some expense.

I have not touched on the subject of the actual analysis, which is a separate matter. It is complicated, and although I do not for a moment suggest that we are not perfectly capable of performing it, as a matter of practice it is usually better to leave it to a specialist. It requires a properly equipped laboratory and much time, and the facilities are never so great that it is not worth the practitioner's while undertaking it himself, when he can get it done for a comparatively moderate fee in most large towns. Furthermore, if the case comes into court the evidence of an independent person who has no connection with either plaintiff or defendant carries more weight with a jury.

The subject of veterinary toxicology is one that has been somewhat neglected, and for obvious reasons is not so important as with human beings, and I only know two works devoted to this special branch, viz., that of MM. Mosselman and Harbrant, of Brussels, and M. Stourbe, of Alfort, but they are in French and have not yet, as far as I am aware, been translated into English.

Gentlemen, I must thank you for the courteous way you have received this short paper, and trust that you will not only criticise my remarks but add something to what in the future will, I am convinced, be not only an important but a lucrative branch of veterinary science.

Before sitting down I must express the honour I feel in having been invited by your President to address you to-day. I had not the pleasure of his personal acquaintance nor of any member of the Society, and I feel that the compliment paid to me by your invitation is therefore all the greater on that account.

A YEAR'S RÉSUMÉ.[1]

BY WALTER PERRYMAN, M.R.C.V.S., LONDON.

GENTLEMEN,—It is with extreme pleasure that I avail myself of this opportunity to express to you my thanks for the honour you have bestowed upon me in electing me your President for the ensuing year. Looking through the list of former presidents, men who have in the past and others who still hold the highest places in the profession, inspires one with a sense of admiration. The standard of excellence such men have set for others to aspire to is one that no president can look lightly upon. However, gentlemen, with your assistance and the co-operation of the officers of the Society, of both of which I feel assured, I trust my tenure of office will be

[1] Presidential Address read at a meeting of the Central Veterinary Medical Society on November 6th.

productive of an advancement of our Society's welfare. Of our late President, Mr. Rogerson, we can say—and I am sure I voice the feelings of all the Fellows of the Society—that he has conducted the meetings of the past session with great judgment and tact, especially when we consider that some of the subjects were of a very controversial character and the discussions of a very spirited nature. Some of these subjects were of vital importance to the profession, though of a social rather than of a professional character, and the importance of which should stir all veterinary surgeons to a sense of their responsibility as professional men in the advancement of the profession and the status of its members.

By means of our various societies distant members are brought into close contact, an exchange of opinions on many subjects takes place which is of mutual advantage, and a feeling of friendship is engendered which is advantageous to the whole.

A presidential address, I understand, should be of such a nature that the listeners will not consider it an infliction, and it often takes the shape of a review of general events.

As good subjects of the King we have felt with the nation the calamity that overwhelmed us at a time when the whole world was looking towards England. I refer to the illness of our Gracious Majesty the King on the eve of his Coronation. The sadness that overcame our great nation was indescribable. We are deeply thankful to Providence for the ultimate restoration of our King to health and strength, and that eventually he was permitted to be crowned. We as surgeons can appreciate how miraculous was the recovery when we consider the nature of the malady and the operation performed, an operation which speaks so loudly of the advancement of antiseptic surgery and medical skill, and one without which, even though the best advice would have been procured, must have resulted fatally.

During the past year the great war that Britain has been engaged in was happily brought to a satisfactory conclusion. This war has brought us in closer connection with our Colonies, and has proved to the world the solidity of the British Empire. Many of our members have done yeoman service under conditions which were undeniably difficult and harassing. As a profession we feel slighted in many ways. Honours to our members who have been at the front are conspicuous by their paucity. Had the advice of the veterinary profession been sought and accepted, much saving of money and animal life would undoubtedly have resulted. The need of a well-equipped A.V.D. has been thrust upon the War Office authorities, and we can only hope that the necessary reforms may be recognised and speedily effected.

The grievances of the members of the A.V.D. will have to be recognised and remedied by the War Office. The Council of the R.C.V.S. has already taken strong action in the matter, and we trust that the threatened boycott will have the desired effect, and that the veterinary profession will be placed on a level with other professions in the Army.

Speaking of the profession generally, I venture to say that never has it been in a healthier condition than it is to-day. Often has it been described as apathetic,—such I venture to say can hardly be the description of it to-day. Our Council is zealously guarding the interests of the members of the profession. The business is carried on with vigour and determination, and our grievances are pointed out, as in the case of the War Office, and

demand made with firmness for immediate redress. Our medical societies all over the kingdom meet and discuss subjects relative to the veterinary profession both socially and professionally, and I say, when we can see such energy amongst our members, then must we conclude that the veterinary profession is awake to its responsibilities.

Our cognisance of these facts must show us the desirability of ourselves keeping abreast of the times, and that our graduates must be capable of filling the important positions to which they are called. Public health, hygiene, and preventive medicine offer a wider sphere to the veterinary student, and to fulfil these duties satisfactorily a high standard of efficiency must be attained.

At the present time the question of Parliamentary representation is agitating the profession. Some of our societies have passed resolutions urging upon the Council the desirability to take steps to fulfil their wishes. At a recent meeting of that body, by a small majority these wishes were frustrated. Many difficulties were propounded, some imaginary, others tangible; still I for one think such a scheme is not impracticable, and I hope at a later date that the Central V.M.S. will express its views on the matter. One thing is certain, that unless we make some effort for Parliamentary honours we shall never get them by passively looking on, hoping for "something to turn up."

The veterinary profession, equally with that of the medical profession, is eagerly looking forward to the report of the Royal Commission on Tuberculosis. Koch's theory of the non-transmissibility of the bovine to the human subject of the disease, propounded at the Congress of last year, was in the nature of a bomb shell, and, no doubt, to many afforded lively satisfaction. A statement coming from such a man as Koch demands respect, whether right or wrong; and much good must result, for never before have scientists grappled with the subject as they are doing to-day. Such investigations must ultimately tend to elucidate the problems how to mitigate or eradicate the disease. Koch at the Congress made his statement emphatic. He, however, as late as October 25th of this year, at the International Congress at Berlin, made the following remark:—"He did not affirm that the transmission of infection from animal to man was impossible, but that such cases were very few." What do we infer from this? That even with Koch himself a change of opinion is taking place, and that his theory is in jeopardy and likely to fall to the ground.

Glanders is still rampant in London,—I think with confidence I can state materially on the increase. The present regulations are a standing disgrace to our Board of Agriculture and County Council. Never under existing regulations will it be stamped out; on the contrary, its spread is guaranteed. We are painfully aware of the legacy we have left in South Africa. Had practical effect been taken of the knowledge we are in possession of not a single glandered horse would have been landed in South Africa by our Army. Our knowledge of the disease has been called into question by our would-be legislators, but without fear of contradiction I state that we know more of the history, course, and treatment of the disease glanders than of any other contagious disease of animals to which the stamping-out order has ever been applied. Had a quarter of the money been used for the eradication of this disease that has been spent on swine fever, the disease would have been long ago catalogued with cattle plague, contagious pleuro-pneumonia, and foot-and-mouth disease, the epitaph

"Departed from amongst us" written large on its tombstone. We can only infer that drastic measures must not be taken when the most valuable and useful of our quadrupeds are concerned, but that such are left to be put in force when the noble dog and pig are affected with a dangerous disease.

Mange as affecting the horse deserves stringent measures, and should be scheduled under the Contagious Diseases of Animals Act. This disease and glanders have ruined more men in London and large towns than all the other diseases put together. They are the two worst scourges that attack a stable. The pecuniary loss through these two diseases is appalling.

Much might be said of such diseases as pneumonia, distemper of dogs, swine fever, and rabies, but time will not allow. Of the two former much useful knowledge can be obtained from a careful study of the proceedings of the National Veterinary Association, held in July of this year. Of preventive vaccination against distemper conflicting opinions are held. Much in this direction was hoped for, but little so far, I fear, has been accomplished.

Swine fever still holds its own against the measures adopted by the Board of Agriculture, and if I gather rightly the opinions of our country *confreres*, radical changes of the stamping-out order will have to be adopted before headway is made.

Rabies, which at one time was believed to be extinct, has unfortunately made its reappearance.

It behoves me to speak of the Victoria Benevolent Society, as it was from the Central Veterinary Medical Society that it originated. Much good is being done to poorer members of our profession and to distressed families. The sum of £500 which has so earnestly been appealed for by the indefatigable treasurer, Mr. Barrett, is now almost an accomplished fact, and thus the magnificent offer from an obscure member of the profession to give £100 conditionally seems likely to be accomplished. To this end the Society is giving £20 this session, and many of the members are individually responding generously.

Recent explorers have discovered a new species of equine known as Prjevalsky's horse, which to us as veterinarians should be interesting. A number have lately been imported to England from Western Mongolia. Whether they will form another source of remuneration to the veterinary surgeon is doubtful, but to the labour market they must be a distinct gain, for we are told that it took a whole tribe of over 1000 men to capture about a dozen foals.

As to the coming session, I wish to invite a cordial co-operation of the fellows in the production of papers and morbid specimens, and spirited discussions on all subjects brought before us.

Now, gentlemen, I will not further detain you as I know more palatable subjects await you in the adjoining room.

THE PREPARATION OF ANTIVENIN.

THE serum used for this purpose is, as is well known, simply the liquid part of the blood taken from the animal which has been immunised against serpent poison. This serum, when introduced into the organism of a

person bitten by a serpent, prevents the poison from having toxic effects, just as serum for diphtheria prevents the diphtheritic poison from producing its effects, and allows the organism to react. The poison of all venomous animals is of the same nature, but differs in strength; therefore the serum will serve against the bite of any species, provided the animal from which it comes has been immunised with poison of greater strength. Thus, for example, the serum of an animal inoculated with the poison of the trigonocephalus will be efficacious against the bite of the common viper, whilst the serum of an animal inoculated with viper poison would be of no effect against the poison of the trigonocephalus.

The preparation of serum is a dangerous operation, and demands not only courage, but skill and knowledge of the habits of serpents. Natives accustomed to handle serpents know how to take advantage of them at the opportune moment, and surprise them before they puff out their necks, seizing them by that part and holding them in such a way that they are unable to get the leverage of their tails. M. Calmette of the Pasteur Institute at Lille adopts a plan of this kind. He first seizes the serpent by the neck with the aid of long and powerful pincers provided with groves, and having their extremities furnished with indiarubber. When once the serpent is fairly secured, the hand of the operator takes the place of the pincers, and holds the head of the animal in such a way that it cannot move. There is then presented to the serpent a large watch-glass, which it bites furiously, and the poison runs down the concavity. To expedite this an operator may squeeze the poison-glands, and so make the poison run faster. If it is desired to preserve the poison thus obtained for a time, it may be dried by placing it under a vacuum-glass, or evaporated under a glass jar with a wide opening, by placing the watch-glass on top of a receiver which contains sulphuric acid. It is possible to collect the poison of serpents killed for purposes of dissection by emptying the glands immediately after death.

In the Pasteur Institute there is received from all tropical countries a great quantity of dried poison. There is likewise at the Institute a pot-house containing ten cages in which some thirty serpents are kept. These cages have glass insides in order that the serpents may not injure their heads; they are also provided with small water-troughs and with stones against which the serpents may scrape themselves when changing their skin. In the upper part of the cage there is a small shutter which permits the introduction of the pincers used for seizing the serpent.

The poisonous snake drinks but does not feed in captivity. If a frog or a rat is introduced into the cage the snake becomes angry and kills the intruder, but does not eat it. It is therefore necessary to force food into snakes in the following way:—They are grasped by the head in the usual manner, and a funnel is placed in their throats by which two eggs are introduced. This operation has to be repeated every fortnight. It may be here stated that a serpent can live for a week on nothing but water.

The animal used for supplying serum is the horse, which is able without difficulty to supply great quantities of blood if proper care is taken to keep him in good condition. The horse is immunised in the following way. M. Calmette begins by injecting beneath the skin of the neck, behind the shoulder blade, gradually increasing doses of the poison. These injections are repeated every four or five days at the beginning, or at greater intervals if the local symptoms are too severe. Generally at the end of some eight

weeks or so the horse (whose variations in weight are watched with the greatest care) is capable of standing a dose of pure poison which would kill about thirty-five rabbits. From this time onwards the local symptoms are less serious after each injection. Six months at least must elapse before the serum is sufficiently active for use as a therapeutic agent; it is, of course, necessary to proceed slowly and with caution, as the horse supports the poison very poorly at first and might easily succumb.

Before the serum can be considered efficacious it must be shown that a cubic centimetre of it injected into a rabbit preserves the rabbit from a dose of poison which would kill a non-immune rabbit in twenty minutes.

Serum not only cures the bitten animals but preserves it against bites; unfortunately the prophylactic effect disappears too soon to be of much importance.

When once the horse has been declared immune it is bled at intervals, and the serum, separated from the coagulum, is collected into capsuled phials of 10 centigrams enclosed in wood and bearing the date of preparation. Injections are made with a sterilised syringe, great precautions being taken to secure cleanliness. The needle is introduced deep into the cellular tissue, and the injection gathers impulse in two or three minutes. For the lower animals the serum is used exactly in the same way as for man and in the same doses. It may be said without exaggeration that, apart from a few exceptional cases in which the poison has been introduced straight into a vein, recovery is certain and takes place without any great delay. It would be easy to cite numerous cases in proof of this, but the two following may suffice. The chief of M. Calmette's veterinary laboratory was, at the beginning of the experiments, twice bitten by rattlesnakes; he applied the treatment and in neither case experienced anything more than a slight numbness in the bitten part. The second case is as follows: Two Annamites in Cochin China were bitten almost at the same moment by the same serpent—a black-headed cobra; one of them was treated with serum two hours after the bite and recovered, the other would not allow the injection and died during the night. A convincing experiment is the following:—If we inject into a vein of a rabbit's ear two-fifths of a centigram (say one-seventeenth of a grain) of a 1 per cent. solution of poison, the animal dies in five minutes. If we take another rabbit and inject 3 centigrams of serum before introducing the above dose of poison, the animal experiences no uneasiness and in the course of a minute will eat a carrot with a good appetite.

The Pasteur Institute sends out 25,000 doses of serum every year. The English and American Governments also prepare serum, the former in India, the latter in Colorado.

THE USE OF COUNTER-IRRITANTS IN RESPIRATORY DISEASES.[1]

BY HARRY W. PERCY, M.R.C.V.S., CHATTERIS, CAMBS.

I KNOW of no subject connected with the diseases of the lower animals about which so much difference of opinion exists as that of the use of

[1] Read at the Meeting of the Lincolnshire Veterinary Medical Association on 19th October.

counter-irritants in respiratory diseases. On the one hand, we have a high authority who says that they are worse than useless, in fact that they are positively harmful; another, equally learned, who says that those who neglect their use miss one of the best therapeutic agents which we have at our command; whilst a third, for whose opinion I have the highest respect, says that the only therapeutic property which counter-irritants possess is—their local action has a general effect.

Now I confess that for a long time I did not know which authority to follow, with the result that I treated all my respiratory cases with counter-irritants of a very mild character. With this happy medium I never felt satisfied, as I merely used it as a "cloak for ignorance."

Wishing to become a disciple of one party or the other, and after taking everything into consideration, I have come to the conclusion that those who maintain that counter-irritants should be used in all respiratory diseases far overstep the mark, whilst those who maintain that they are useless are equally wrong.

Without making any further prefatory remarks I shall now endeavour with the best of my ability to show you when and where counter-irritants should be used.

The first disease of the respiratory tract to which I consider counter-irritants useful is laryngitis. Laryngitis, as you are well aware, is not a very uncommon disease among horses, more especially those when first taken into the stable or dealer's yard. As a rule it is not very fatal, but a great deal depends upon the nature, character, and extent of the disease. It may be anything from a slight local inflammation to an intense inflammation with an effusion thrown out in the sub-mucous coats, which tends considerably to obliterate the opening of the glottis. There are several other pathological conditions found, but the foregoing are sufficient to illustrate my case. In all such, relief can be given by performing tracheotomy, but I think you will agree with me that such extreme measures are only necessary in very extreme cases. In the great majority of cases great relief can be given by the timely application of some counter-irritant to the region of the larynx. Very few will doubt the benefit to be derived in such cases, as it has been proved over and over again even by those who do not advocate its use in chest diseases.

In order to understand how this change is brought about it will be necessary to consider briefly the anatomy and physiology of the region.

Skin.—This is the outer covering of the laryngeal region, and is divided into two parts, the dermis and epidermis. The dermis is abundantly supplied with glands, blood-vessels, and nerves. The nerves are arranged in two layers, one loosely distributed in the corium, the other very close and lodged in the papillary layer of the corium. The inner surface of the skin is applied to the muscles or tissue beneath by what is known as the subcutaneous areolar tissue. The areolar tissue is intermixed with blood-vessels and nerves which go to supply the skin. In some cases the nerve supply to the skin is derived from a branch given off from one of the cerebro-spinal, but in this region the nerve supply is derived from the same source as the tissue which they cover.

Muscles.—The muscles which surround the larynx are:—Crico-thyroid, Crico-arytenoid, Postcrico arytenoid, Labialis, Thyro-arytenoid, and Arytenoideus. All these muscles are paired with the exception of arytenoideus. The innervation of these muscles are somewhat peculiar in that they have

two different nerve supplies, all of which are supplied by the inferior laryngeal, except the crico-thyroid, which has its supply from the superior laryngeal.

Mucous Membrane.—The mucous membrane of the larynx resembles somewhat that of the muscles which surround it inasmuch as it has two distinct nerve supplies — the two foci of the epiglottis and arytenoid mucous membrane are supplied by the superior laryngeal nerve. This nerve is endowed with a very high degree of sensibility, so much so that the slightest touch causes a fit of coughing. All of us have felt this slight irritation at times owing to a crumb or such-like touching the part.

This extreme sensibility at the entrance of the larynx is, I think, of great clinical importance, as it explains why putrid pneumonia should so often follow the administration of large doses of sedative medicine, as given during an attack of colic and other kindred diseases. Sedative medicine not only diminishes nerve sensibility after absorption, but also paralyses the nerve terminals with which they come in contact during their administration. If the sensibility at the entrance of the larynx is diminished it is only natural to suppose that if great care is not taken in giving medicine some will gain entrance into the lungs and thus set up pneumonia.

This peculiar innervation also explains the reason why horses predisposed to roaring are generally noticed to suffer from laryngeal irritation, whereas confirmed roarers have the sensibility diminished—hence the difficulty of making such animals cough by squeezing the larynx.

Inferior Laryngeal Nerve.—This nerve supplies all the mucous membrane except the entrance of the glottis. This nerve I may mention is not supplied with a very high degree of sensibility and in this respect it resembles that of the trachea.

Now we have got so far as to know that the mucous membrane of the larynx is supplied by the same nerves as the muscles which surround and work it, namely, the superior and inferior laryngeal nerves. At the junction of the skin and muscles small filaments are given off from these nerves to supply the skin. In order to show how the application of counter-irritants to the skin act it will be necessary for me to go more into detail.

The vaso-motor mechanism consists of nerves which control the vascular system of the various parts of the body. The centre is situated in the medulla, with less important centres in the spinal cord. From these centres "efferent" or outgoing nerve fibres run to the vast arterial districts of the skin and other parts. "Afferent" nerves convey impressions from the periphery of the body to the nerve centres. During the greater part of the time these fibres are engaged in carrying out impulses just strong enough to keep the walls of the vessels in a state of moderate contraction, spoken of as "tone."

From time to time as occasions arise these centres send out impulses which either produce contraction or dilation of the vessels. The "centres" are induced to bring about these changes either from the brain itself or from impulses from any part of the body, including the skin. On the application of some counter-irritant to the laryngeal region in case of disease, let us see how the good effect is produced. The first thing we find is an increased flow of blood to the part, accompanied by pain and uneasiness. This hyperæmia or dilation of the vessels is either brought about by direct paralysis of the vaso-motor nerves of the part stimulated, or by its indirect paralysis from irritation of the sensory fibres in the skin—inferior

and superior laryngeal. If the irritation is severe, not only do we get dilation of the vessels and accelerated blood flow, but also a subsequent retardation of the circulation and migration of corpuscles. These leucocytes pass through the cell walls of the small vessels by virtue of their amœboid movement and under the attraction of the non-specific microbe which in this case is the exciting cause of the disease. Here guerilla warfare is waged for some time until eventually the leucocytes become victorious, when all the phenomena of congestion and inflammation gradually subside, to be replaced by normal cell activity and freedom from pain.

PLEURISY.

Inflammation of the serous membrane that lines the cavity and covers the viscera of the chest. It may be either partial or general, single or double.

At the onset of the attack the inflammatory changes commence in the sub-pleural tissue, the blood-vessels of which become congested. At first the congestion presents an irregular spotted appearance. These spots rapidly multiply and the red colour becomes diffused by their running together. In other instances the pleural surfaces present a streaky appearance; whilst in others the whole pulmonary and costal pleuræ present a red congested appearance over their surface.

The secretion of the pleural surfaces is at first suspended, and if you auscultate with the phonendoscope a dry friction sound will be heard. This dryness of the membrane is very shortly succeeded by an effusion of serum and the formation of an exudate which has a tendency to become organised into a false membrane, causing adhesions on the two pleural surfaces.

Pleurisy is a rather painful disease, and one which, if great care is not taken during examination, may lead to grave error in diagnosis. If the sides be closely examined the muscles covering the affected part will be noticed to tremble or quiver, but this only lasts for a short time, to be succeeded by diminished motion. These signs, as well as the pain on pressure, indicate that the intercostal muscles participate in the inflammation and that pleurisy is generally associated with pleurodynia, first described by Haycock. This is exactly what one would expect to find if we only consider for a moment the anatomy and physiology of the part.

Here, again, we have exactly the same state of affairs as I have endeavoured to show you in laryngitis—the skin and muscles which cover the ribs have the same nerve supply as the costal pleuræ. If the nerve terminals found in the costal pleuræ are irritated, as found in pleurisy, it is only natural to find the nerves in the skin and muscles participate in the irritation, hence the pleurodynia. As I do not wish you to take anything for granted, I shall review the anatomy and physiology of the region involved. According to Colonel Smith the following are the muscles which aid in respiration:—External Intercostal, Internal Intercostal, Serratus Anticus, Levator Costorum, Abdominal, Transversalis Costorum, Serratus Posticus, Triangularis Sterni, Serratus Magnum, Latissimus Dorsi, Scalenus.

All these muscles derive their nerve supply from the dorsal, with the exception of the last three, which derive theirs from a branch of the brachial plexus.

Dorsal Nerves.—These nerves, numbering seventeen pairs, proceed from the lateral aspect of the spinal cord by two roots, one motor, the other sensory. These two roots in passing through the intervertebral foramen

unite in a very short trunk, which immediately divides into two terminal branches—superior and inferior.

Superior Branches.—These are destined to the spinal muscles, and to the skin of the dorso-lumbar region.

Inferior Branches.—These are more considerable in size than the superior, and descend into the intercostal space between the pleura and the internal intercostal muscle, or even in the texture of these. They terminate in the following manner: Those of the sternal ribs transverse the pectoral muscles, giving filaments to these, and are expended in the skin of the sub-thoracic region. The nerves of the asternal ribs enter the abdominal muscles, passing between the transversalis and rectus abdominal muscle, and give off filaments to the skin of the abdomen.

In their course these nerves furnish numerous filaments to the intercostal muscles, and in addition give off about the middle of their length a very thick division—the perforating intercostal branch, which traverses the costal muscle and descends beneath the panniculus carnosis, ramifying partly in the muscle and partly in the skin covering it. The most anterior perforating branches generally anastomose with the subcutaneous thoracic branch of the brachial plexus. This latter nerve acts as a satellite to the spur vein above which it is situated. It may be followed to the flank, where its terminal divisions are lost in the substance of the subcutaneous muscle. In its course it gives off filaments which anastomose with the anterior perforating branches already mentioned, and which form an elaborate network on the inner surface of the panniculus. The panniculus, as you are aware, is a large, broad, fleshy muscle situated on the inner surface of the skin covering the thorax and abdomen.

Now we have got so far as to know that the nerve supply to the muscles which aid in respiration are identical with those which supply the skin of the thorax and abdomen.

PLEURÆ.

The serous lining of the thorax comprises two distinct membranes designated as the pleuræ, constituting two sacs placed one against the other in the middle line, and forming a septum named the mediastinum, which divides the thoracic cavity into two lateral compartments. Each pleura therefore covers the external wall of the thorax as well as that of the diaphragm; it is afterwards reflected in the vertical and antero-posterior plane of the cavity to concur in the formation of the mediastinum, whence it is carried over the lungs.

This arrangement exhibits the pleuræ in four portions: costal, diaphragmatic, mediastinal, and pulmonary or visceral. It is with only the first of these I shall dwell for the present.

Costal Pleura.—This is applied to the inner face of the ribs and intercostal muscles, strengthened on its adherent face at each intercostal space by a lamina of yellow elastic tissue. This membrane responds by its free face to the external face of the lung which in normal condition "contracts no adhesion."

Nerve Supply Intercostal.—I showed that these very nerves supplied also the skin covering the muscles which aid in respiration. Here again we have the same principles to guide us as I have shown in the case of laryngitis.

This distribution of nerves, I think, fully explains why animals are more subject to pleurisy during cold winds or exposure than at any other time.

Take the case of a horse recently clipped or exposed to the inclemency of the weather. After a short time a slight shivering is noticed, which gradually increases, and if not looked after may lead to a very grave illness. This shivering, I am inclined to believe, is an outward visible sign of an inward pathological condition.

In pleurisy we apply counter-irritants to the chest wall in order to act reflexly on the costal pleuræ, and in this way promote cell activity and the removal of the cause. Not only do we find good results produced in the early stages of the disease but also when it is associated with water in the chest. In such the entrance to the lymphatics are usually closed by an albuminous substance which prevents absorption of the effusion. By applying counter-irritants to the chest we promote cell activity, which gradually removes the seal at the mouth of the lymphatic spaces, and in this way gets rid of the effusion.

PNEUMONIA.

Inflammation of the lungs is a disease in which all the textures of the lungs are more or less involved. It may be single or double. Clinically we recognise it as simple—contagious, putrid.

Simple pneumonia if properly treated is not a very fatal disease, but in my experience putrid pneumonia is nearly always fatal. This latter condition is considered by some as a sign of a previous attack of pneumonia at some earlier period in the animal's existence. With this latter statement I do not agree, as I have good grounds for believing that it occurs in animals previously free from disease. In my limited experience I could trace nine cases out of ten to the mal-administration of medicine or other drinks, such as linseed oil.

ANATOMICAL DIFFERENCE BETWEEN A CASE OF PNEUMONIA AND PLEURISY.

Unlike laryngitis and pleurisy we have no direct or indirect connection as far as I can make out between the skin and the lungs. The pulmonary pleura of the horse is intimately adherent by its deep face to the tissue of the lungs. Its free face is covered by epithelium, it is perfectly smooth, always in contact with itself, and constantly lubricated by a serous fluid which facilitates the gliding of the lungs.

Nerve Supply.—Sympathetic and pneumogastric—the same nerves which go to supply the lungs. If we have no direct or indirect connection between the part stimulated and the diseased area I fail to see how we can expect to get any beneficial results. For all intents and purposes I look upon the lungs and visceral pleura as outside the animal's body.

The application of mustard, turpentine, and cantharides to the sides of a horse suffering from pneumonia I consider worse than useless, in fact I look upon them as positively harmful. They excite the animal by the pain which they produce, causing great distress in the breathing, the very thing which we should avoid if we wish to be successful. The only time which I consider we are justified in adopting such therapeutic measures is when the extremities are cold owing to a faulty circulation.

Under such circumstances mild stimulating liniments rubbed on the legs are very often useful and bring about a great change for the better.

This, gentlemen, brings me to the end of my theme, which I hope has not wearied you by too many technicalities. If I have failed to convince

you of the truth of my reasoning I trust you will forgive me and look upon it merely as the offspring of an idle brain begot of one hailing from a country which is "so rich in dreams, so poor in wealth."

THE PLAGUE OF TICKS: THEIR DESTRUCTION BY OIL SPRAYING.[1]

Eastern Province Experiments.

BY C. P. LOUNSBURY, GOVERNMENT ENTOMOLOGIST, CAPE COLONY.

Tick destruction has become a stock-farming problem of considerable importance in South Africa. Everywhere in the country ticks are more or less of a pest, and in many sections they are a veritable plague. The south-eastern and eastern seaboard is the most afflicted part of the Cape Colony, but stock often suffer severely in southern and south-western districts, and even in portions of the Karroo. Year by year the evil has been increasing, in some places slowly, in others rapidly. A prominent Willowmore farmer recently told the writer that ticks were no trouble at all in his locality five years ago, whilst now the Bont Leg species is so injurious to his stock that he fears he will be driven out of sheep farming by it.

Various remedies are employed in the Colony to destroy ticks, but most are used in a more or less haphazard manner, with little attempt at system or thoroughness. I am told that many natives practise greasing their cattle, and that in some kraals hogs are reared chiefly to furnish fat for the purpose. Tick clipping with scissors, leaving the parasites to dry out on the skin, or to drop off as may chance to follow, is a common resort along the coast. One old pioneer of the East London district writes that he pays his native herdsmen to collect female Bont ticks from his cattle, giving them 3d. for each fill of a half-pound jam tin. In this way he estimated to have obtained between two and three bushels of ticks last year. A great many farmers now spray or hand dress with one or another of the numerous carbolic and arsenical sheep dips at a heavy expense for materials and labour, and, unfortunately, through ignorance of the habits of the ticks, most of these men grossly over-estimate the value of their applications.

Incidental Evils from Ticks.—There are many distinct kinds of ticks on stock in the Colony, and aside from the direct injury the various kinds do in draining off the blood of their hosts, some sorts transmit disease. The common blue tick is no doubt the usual if not the sole agent in the spread of redwater; the Bont tick spreads heartwater; and the dog tick spreads malignant jaundice, or what is more commonly, though wrongly, called distemper. Probably other diseases are similarly disseminated, and not only diseases but putrefactive organisms that give rise to open sores that seriously affect the health of stock. One small tick, a species of *Ixodes*, is considered by many observant farmers to be responsible for a form of paralysis in sheep common in several eastern districts; and much lameness in stock, both large and small, is directly due to deep biting ticks like the Bont Leg and the Bont.

Of all the various ticks probably none is so pernicious in its effects as the Bont tick (*Amblyomma hebræum*), and it is against this species that

[1] From the Cape Colony *Agricultural Journal.*

most attempts at tick destruction in Cape Colony have been specially directed. This tick is very abundant along the Fish River Rand in the northern part of the Albany district. It was here that the first really systematic and intelligently directed efforts at tick destruction in South Africa, of which I am aware, were begun. The man who instituted this work was the Hon. Arthur Douglass, M.L.A., and the remedy he adopted and still faithfully follows is

Paraffine Oil Spraying.—For many years ticks had been getting steadily worse on Heatherton Towers, Mr. Douglass' property, and along in 1896 he concluded that he must manage to suppress the pest or soon cease cattle farming. The various dressings that were and are still more or less used by others were tested and one by one discarded as inefficient. A dipping vat was constructed, and some dipping tests made, but various circumstances led to the abandonment of dipping in favour of spraying. His efforts to find a successful wash were finally rewarded by his demonstration that paraffine oil, the ordinary illuminating oil found in every household, answered the requirements. Other colonial farmers had used paraffine against ticks, but when put on with a sponge or cloth, as was usual, it was less effectual against ticks, and burned the skin of the animals. In America, too, paraffine had for several years been employed as a cattle spray, but Mr. Douglas did not know of this, and the fact should not detract from the credit given to him. His delight at the discovery was unbounded, and with characteristic enthusiasm he issued an invitation early in 1898 to all and sundry interested to visit his farm on an appointed day to witness a practical exposition of tick killing by the newly found agent. The value of the demonstration was not wholly the bringing forward of oil as a spraying material, for of almost equal importance was the exhibition of how a wash could be economically and quickly applied by having the cattle being treated enclosed in a narrow passage between two fences.

A large number of farmers attended the demonstration, and by them and the newspaper reporters a knowledge of the remedy was quickly disseminated throughout the surrounding country. Many farmers have begun to follow his example, but not nearly the number that should do so, or that would have done so had it not been for the troublous times through which the Colony has but just emerged. Now we may expect a more general crusade against ticks, and hence it is a most fitting time for the review of this oil remedy. The first requisite when many cattle are to be sprayed is the passage in which to enclose them. This is called the "race."

The Douglass Race is a passage 23 feet long and 2 feet wide between wires. It accommodates three adult cattle at a time. The posts for the sides are set about 6 feet apart and are bedded in cement. They are strung with eight horizontal size No. 6 wires stayed with three ties of doubled No. 8 wire between each two posts. The top wire is 5 feet from the ground. The floor is made 9 inches to a foot thick, and is finished with cement mixed with good sand in the proportion of one to three. It is depressed along the middle and slopes towards one end, where it drains into a cemented hole at the side. To enable the men to better spray the under side of the animals, a trench about 2 feet wide and nearly as deep extends along each side close to the fence; therein the men crouch who handle the spraying nozzles. A heavy swing gate closes the end of the race when cattle are enclosed, and long poles inserted on the wires are placed between the cattle to hold them apart. The high iron fence at one

side of the race was erected as a breakwind, that heavy winds might not interfere with the work.

The Roberts Race was built much later than the Douglass Race, and naturally embodies some improvements. In fact Mr. Roberts built a temporary race in close accordance with the Douglass specifications, and erected his present substantial one after he had gained sufficient experience with the first to know just what was wanted. The race is built in his calf kraal against the front of his long calf shed, the supporting posts of which are utilised so far as they are in place. In extreme length, that is, from the front of the first post to the back of the last, it measures 21 feet. Three cattle at a time are accommodated. The front beast is allowed 3 inches short of 8 feet in which to stand, and the second and third beasts 6½ feet. There are eight posts in all on each side. These are not spaced quite uniformly, but so as to have one close behind each animal as it stands in place, and others intermediate. There is a single intermediate one in the hind and middle sections and two in the longer front section. The nearness of the posts to one another obviates the necessity for wire lacings. They stand 5 feet high and are connected by a beam of heavy native wood, about 2 inches by 6, which extends along their tops outside. This beam is bolted in place and forms an efficient brace. 3 feet and 3 inches above the floor—that is, mid-flank high on an ox—a gaspipe of 1½-inch diameter extends along the sides of the race on the inside of the posts, the posts being cut away slightly to receive it. Between the floor and the gaspipe are four heavy wires, and between the gaspipe and the brace above is another. I believe Mr. Roberts later decided that there should be two above the gaspipe, but only one was up when I last visited the place. The wires are let through the posts as is usual in South African fencing.

The width of the race between the two lines of gaspipe is 24 inches, which is just wide enough to take the largest ox on the farm. The front of the race has a "Roberts' patent gaspipe gate" about 3 feet wide by 5 feet high. The floor consists of set stones covered with 2 to 3 inches of cement, and like the Douglass it is graded to drain down the middle and into a cement-lined excavation at one side. A hard floor is a necessity. A soft floor quickly becomes a quagmire, and even a cement one soon becomes fouled during spraying by the accumulation of dung, urine, and dripping spray.

The animals are kept separate in the race by short poles passed between them through wire loops in front of the posts. The animals naturally press forward and the back beasts get their heads over the separating poles. The front one is held back by the gate, and hence the reason for making its section of the race longer than the others. Behind the race proper is the Crush Yard, which leads from the kraal. This yard has strong side fences that converge towards the race. A dozen or more cattle, as may be convenient, are driven into the crush from the kraal, and then as they are wanted they are urged along into the race. From the front of the race the exit is into a camp.

Horse and mules are passed through the race and are sprayed just as are cattle by both Douglass and Roberts. The latter keeps no sheep and the former only two or three hundred, which are hand dressed. The ostriches at Heatherton Towers are, however, sprayed with oil and water for the Ostrich Fly (*Hippobosca struthionis*) and lice, but not for ticks, of which the birds are able to keep themselves fairly free.

The first time animals are driven into a race they are apt to go very unwillingly, and when once in may make violent exertions to jump over the front or sides or to crawl out beneath. A heavy hard-wood gate on the Cottesbrook race was quickly smashed by a vicious ox, but though the gaspipe one has been charged and jumped on times without number it has resisted every strain without being injured. The race gate should be kept open when the animals are driven in until the foremost is in his place, and then it should be quickly shut in his face and a pole put back of him before he can retreat. After having been sprayed a few times, however, there is little trouble in urging the animals on, the wildest of them generally moving quietly forward in their turn as if conscious of the benefits of the treatment.

Some farmers do not use a race in spraying, but tether their cattle to posts in the kraal instead. When only a few tame cattle are concerned this procedure is not a bad one, but it is cruel and exceedingly laborious when a large lot of half-wild cattle have to be handled. Milch cows that are stabled (as few are outside the towns at the Cape) may be sprayed in their stalls, but they should be turned out immediately afterwards.

The time required to spray cattle in a race after the men and animals have become accustomed to the routine averages about a minute a head. Sixty animals an hour are ordinarily handled at both Heatherton Towers and Cottesbrook with sprayers working simultaneously on the two sides of the race. Seventy-five to one hundred animals can be hustled through, but the first requisite of cattle spraying is thoroughness, and to obtain thoroughness the men at the nozzles must not be unduly rushed.

Five or six men are needed at the work, one or two at the pump or pumps, one on each side to spray, one behind to drive, and one to attend the forward gate. The most trustworthy men should be at the nozzles, for the ticks that are not hit by the spray will continue to live. The animals are not sprayed all over.

Only the under and rear parts, the dewlap, tail, feet, and legs are generally sprayed, for few adult Bont ticks are found elsewhere. The men keep a sharp look-out, however, and wet down any that chance to be high on the flanks, and may spray the whole body if the Blue Tick is abundant. Bont ticks on the sides and back and along the tail are more common amongst sprayed cattle than unsprayed. This is because males that get in these unusual positions may be overlooked in spraying, and, the other males being killed, the females search further in quest of mates, thus finding those in the exceptional places which ordinarily are quite overlooked.

Mixed oil and water soon superseded the use of pure oil, and for the application of the two liquids together specially fitted pumps are necessary. At one time his race had an extension to hold three cattle after spraying, that the oil dripping from them might be saved; but with the use of diluted oil it became of small advantage to save the extra drip, and the extension was removed. Mr. Douglass uses two "Douglass Patent Syphon Pumps" for his spraying, whilst Mr. Roberts has one large pump that he fitted up himself; it delivers two streams, one of which is led through an iron pipe laid under the race for the supply of the hose on the further side.

Mr. Douglass has his pumps set to supply twenty-five per cent. of oil. Mr. Roberts sets his at twenty per cent. Experiments which Mr. Roberts and the writer conducted showed that fifteen per cent. mixture well applied was fatal to the ticks, but no pump always works perfectly true to its gauge, and hence some allowance is necessary.

The quantity of oil used at Heatherton Towers approximates ten gallons to one hundred head of mixed cattle, and at Cottesbrook the average is a trifle higher, being about ten and two-thirds gallons. Ten gallons in a twenty per cent. mixture for one hundred cattle averages a half gallon of liquid to a beast. The amount of oil recovered from the drain holes is usually from five to ten per cent. of the total used. Mr. Douglass has all the drainings poured into a large tank, and has all the oil skimmed off after twenty-four hours. Mr. Roberts generally boils his before skimming and thinks he saves by the method.

The interval between sprayings is made fourteen days at Heatherton Towers and twelve days at Cottesbrook. Mr. Douglass at first thought one spraying a month would do, but soon found the interval too long and reduced it to nineteen days. The idea is to spray sufficiently often to prevent any female Bont ticks from maturing. In 1899 the writer traced the life cycle of the Bont Tick and found that the female took six and one-half days or longer to fill up on an ox. Few were found to fall until eight days had passed. It so happens, fortunately, that a female rarely attaches except by a male that has been on several days, and that when one does attach elsewhere its development is very slow until after it has contrived to mate. No observed males have become attractive until they have been on four days, and few have attracted until they have been on five or six. Therefore the period after a thorough spraying, during which no female can mature, may be calculated as twelve days, which allows for a male attaching the day of spraying and of becoming ready for company on the fifth day, and for a female then at once finding this male and becoming ready to drop on the last day. It seems unlikely that any females will actually fill up in the minimum time, particularly as one would imagine the presence of the oil to have a deterrent effect for a day or more, and it was thought quite safe to make the interval between sprayings an even fortnight. Mr. Douglass adopted this interval soon after the tick studies were published, and seems still satisfied that it is short enough. Mr. Roberts, however, after two years' experience, fears a few females are permitted to mature, and has now cut off the two extra days. It must be remembered that if any Bont males escape a spraying, new females may mate with them at once, and perhaps be matured in seven or eight days; the necessity for very thorough spraying is thereby emphasised.

The common Blue Tick stays on an animal three weeks or more; very few specimens indeed come off under twenty-three days. Hence the complete destruction of all that come on the animals once in three weeks should prevent any of this species from fully maturing. The females of the Red Tick, the species found clustered about the anus and genitals, may go on coincidently with males and drop off six days later fully engorged, and hence dressing for it would have to be at least every six days to be most effectual; but, fortunately, this species is not one that requires repressive measures. It spends a fortnight or more in the ears of animals in its early stages, and could there be destroyed at longer intervals were it not that syringing ears with paraffin is too harmful a measure to warrant adoption.

The effect of oil spray on the ticks begins to be apparent almost at once, and in an hour after spraying most of the victims are dead. On the next day many are already dry and easily break off. Engorged female Blues become shrivelled, blackened, and hard, and look as if they had been parched. It is not easy to determine the full effect until after twenty-four

hours, so judgment on the success of a spraying should be suspended for that length of time.

The Bont Tick is as quickly destroyed by the spraying as any other kind. The Red Tick is the most likely to escape, as the skin where it prefers to attach is devoid of hair, and the spray therefore fails to remain. The Blue Tick when actively feeding is almost certain to die; but when it is hanging dormant waiting for a change of skin it stands a good chance of escaping. The Blue is the only species of tick that we have that always remains on the animal at such times. The efficacy of the spray largely depends on its being held on the animal in contact with the ticks for a short space of time. It is the oil on the hair rather than that on the skin that does the killing. Oil rubbed on with a cloth is apt to burn the skin and yet not kill all the ticks, for the hairs get little of it. But an oil spray should be fairly hard, hard enough to drive against the skin, or the bases of the hairs will not be wetted and many young ticks close against the skin will escape. The Bont Tick will often survive a momentary immersion in pure paraffin, and this anomaly has made some people doubt the efficacy of spraying; but they have only to try spraying once to discover how differently the spray acts to the momentary dipping.

The effects of oil spraying on the animals is generally not injurious in any respect. In hot, dry weather the oil soon evaporates without causing any damage to the skin, even when sprayed on undiluted. When cool, cloudy weather prevails, or when the spraying is done late in the day, a slight inflammation of sensitive skin may result, however much or little oil is used, but this injury is rarely enough to cause any suffering. Those who spray naturally take reasonable precautions to avoid injuring the animals. As far as can be arranged, the spraying is done early on fine days, and stabled animals are allowed to dry before they are again put under cover.

The oil-water mixture seems far less apt to inflame the skin than paraffin emulsion,—that is, the milky mixture formed by churning paraffin in strong soap and water, and the simple mixture is more destructive to the ticks.

As ticks have decreased on their farms, both Mr. Douglass and Mr. Roberts have ceased to spray in the winter. Mr. A. W. Douglass, son of the Hon. Arthur Douglass, who is now farming Heatherton Towers, sprays during eight months only, September to April inclusive. He says very few ticks are now seen on the cattle during the winter. Mr. Roberts has his cattle brought up to the race at the regular periods and simply hand smears the few ticks found on them. Three years ago the Bont Tick was numerous on his cattle all through the winter, and many of them were studded all over with the Blue species even in July.

How long must Spraying be continued?—No strict time limit can be put. The chances are that the remedy as practised by Mr. Douglass will be needed, without any relaxation, at least through the summer months, for all of three years and perhaps five. After one season of faithful spraying, a decided improvement will be evident; but even after five years it is probable that several sprayings every season will be necessary, and necessary indefinitely thereafter, to keep the pest well suppressed.

Spraying has been practised as regularly as conditions permitted for four years at Heatherton Towers, and there was still a fair sprinkling of ticks, I am told, on the cattle last summer; but the improvement over five years ago is said to be immense. In a recent letter from there I am told that the stock now prosper as they have never done before. The heifers almost invariably come up after calving with all their teats; and sore

udders, so much in evidence on farms badly infested with the Bont Tick, are a thing of the past at Heatherton. The reduction of the pest, in Mr. Douglass's estimation, has added £2000 to £3000 to the value of the estate, and he thinks many hundreds of thousands of pounds would be added to the value of the coast farms in his part of the Colony were only oil spraying generally adopted. With the suppression of ticks, he and many others implicitly believe that sheep farming, and consequent great prosperity, would extend again right down to the coast.

A farm near Heatherton Towers, worked by another son of the Hon. Arthur Douglass, has likewise been almost cleaned of ticks. Spraying has been carried on there for three years. It used to be almost as lively a spot for ticks as exists anywhere, and I became most painfully aware of the infestation by a brief visit. Young Bont ticks do not respect entomologists.

Much better results than have been obtained at the farms mentioned may be confidently expected by farmers who now take up the spraying and pursue it thoroughly. The last two or three years have been too full of more serious work for the few who have sprayed for them to get the most out of the measure. For months at a stretch during the invasion the men had to be on military duty, and the spraying when not altogether neglected had to be left without proper supervision.

When spraying becomes more general and as more experience is acquired, it is likely that the present routine will be varied and improved upon. I fancy, myself, that a weekly spraying from the middle of December to the middle of April, say eighteen sprayings in all, will reduce the ticks much more quickly than spraying every other week throughout the year. Far more larvæ and nymphal Bont ticks, stages which remain on only about six days, would then be destroyed. But it has yet to be demonstrated that the cattle will stand a weekly treatment. If they are harmed by it, it may be open to proof that a weekly spraying for eight months in the year will almost clear out the ticks in two years' time. What is now wanted is that the remedy be taken up and pushed. It is certainly worth it.

Clinical Papers.

THE OPEN AIR TREATMENT OF PNEUMONIA.[1]

BY JOHN STORIE, M.R.C.V.S., EAST LINTON..

THE Lothians and Berwickshire Imperial Yeomanry, for which Regiment I have the honour to be Veterinary Officer, went into camp at Dunbar on July 16th of this year. The horses, numbering about 300, were accommodated as follows:—130 in the cattle sheds in a farm-steading, 130 in a long wooden shed erected for the purpose on the links, and about 40 in a round shed about a quarter of a mile from the steading.

Before going into camp I had secured a large wooden implement shed as a hospital. It was about 20 feet high, and had a roof and three sides, affording only partial protection on the sides. In this I had divisions put up about 5 feet high, so you can understand the boxes thus formed were quite in the open air. You can remember the cold changeable weather we had in the month of July, which made it exceptionally trying for horses

[1] Read at the Meeting of the Scottish Metropolitan Veterinary Medical Society, November 19th, 1902.

which had just been brought from warm comfortable stables. It was not at all surprising under these circumstances that in a day or two several were coughing and off their food. However, nothing serious occurred until the 24th, when I was confronted with an acute case of pneumonia, and seeing that we are accustomed to treat such cases as a rule in comfortable loose boxes, you can easily imagine my consternation under existing circumstances, more especially when I learned that my patient was a valuable four-year-old hunter worth something like £150. However, there was nothing for it but to make the best of what appeared to be a bad job. I may as well describe this case; it is a fair sample of those that followed. I had the mare placed in one of the hospital boxes. On examination I found her temperature 106, pulse 75, severe rigors, and much pain on pressing the right side of the chest. On auscultation I found considerable consolidation of the right lung. Fortunately there was a copper for boiling water on the premises, and a plentiful supply was ready for use in an hour's time. In the meantime I administered 2 drs. ammon. carb. in a capsule, and had the patient well sheeted and the legs bandaged. Whenever the water was ready for use hot fomentations were applied to the chest and continued for two hours, and for every alternate two hours during the day, after which the interval was increased to four hours, and after three more applications it was discontinued. Fever medicine was given at intervals, and ammonia liniment applied to the chest. On the fourth day the temperature and pulse were almost normal, and crepitations could be distinctly heard in the consolidated lung. From this onwards recovery was rapid. I had another case on the 25th, two on the 26th, one on the 28th, two on the 29th, one on the 31st, and two on August 1st,—in all, ten cases. All were more or less similar to the first, the third and fourth having severe coughs, which were rather persistent. Much the same treatment was adopted, and all made rapid recoveries.

Nine of the cases were amongst horses standing in what you would say was by far the most comfortable stabling, viz., in the sheds in the farmsteading, only one occurring outside in the long shed on the links, and that in a three-year-old, while there were none in the round shed. The only way that I could account for this was that the soil in the two latter sheds would be perfectly pure, whereas in the former it would be contaminated by cattle having been fed on it for years, and there was also a very imperfect system of drainage.

What I wish to draw your attention to is the very rapid and complete recovery of these cases as compared with what you usually have in ordinary circumstances, and in future it would perhaps be advantageous in treating such cases to make sure that they had a full supply of pure air rather than too little.

TWO UNIQUE CASES.[1]

BY JOHN CONNOCHIE, M.R.C.V.S., AYTON.

THE two cases I am about to describe are, to me at least, rather puzzling, and it is with the expectation of having some light thrown on the conditions manifested that I venture to bring them before your notice. One case occurred last year and the other a few months ago. An account of the former appeared in the *Veterinary Journal* for March 1901. The subjects of both cases were white bullocks, but the similarity of colour I ex-

[1] Read at the Meeting of the Scottish Metropolitan Veterinary Medical Society, November 19th, 1902.

pect is purely a coincidence. The symptoms shown by both were nearly identical, and were almost typical of choking, viz., tympany of the rumen, protrusion of the nose, difficulty in swallowing, &c., but in addition there was a swelling along the lower border of the neck, commencing abruptly behind the lower jaw, and extending downwards almost to the sternum. It also reached up each side of the neck until above the level of the jugular furrow, and was pretty uniform on either side, although slightly larger on the left. On manipulation it was found to be extremely hard, tense, and slightly painful. Just at first rupture of the œsophagus suggested itself, but there was no history of choking and use of the probang, and, besides, the swelling, as before stated, was nearly as extensive on the right side as on the left. Then it differed from the swelling seen in malignant œdema, as that of the latter is very diffuse, extending generally from near the chin right down to the dewlap, doughy to the touch and inclined to pit on pressure. Diagnosis therefore was not easy. As deglutition of solids was impossible, strength was maintained as well as possible by milk and gruel, which were got down with a little difficulty. By way of treatment the rumen was at once punctured and the canula left in, then fomentations, belladonna plasters, liniments, and woollen bandages were applied to the swelling with little or no effect. In the case of No. (1) bullock it did soften a little in the course of a fortnight, so that I was able to conjecture that it contained fluid. Acting on that belief, I therefore chose a suitable spot, clear of the blood-vessels, and introduced a fine trocar and canula, from which at once there escaped a large quantity of whey-like fluid. I at first thought it was thin pus, but decided afterwards that it must be what was left from the gruel and milk after the albumen was precipitated. To try and ascertain if any connection existed between the œsophagus and the swelling I passed the probang and found that it passed down opposite the swelling with considerable difficulty; but I could not be certain that it ever really entered the stomach, it seemed to catch just about the entrance. I next drenched the animal with pure water in case there might be dilatation of the œsophagus, but none escaped by the canula at least for a time. The canula was kept in position by a cord round the neck, and the amount of whey-like fluid which escaped was enormous. There always seemed to be more just after the animal was fed. As recovery seemed impossible he was put down. On making an incision right into the swelling some gallons of whey-like fluid escaped from a large sac or cavity, the boundary wall of which was formed by the muscles of the lower part of the neck, chiefly the subscapulo hyoideus and the sterno maxillaris. Anteriorly it terminated in a blind pouch-like extremity just behind the origin of the aforementioned muscles, and posteriorly it narrowed down into a canal or tube about double the size of the trachea, and passed along with it and the œsophagus straight into the thorax. At its widest part in the neck the trachea partly divided it into a right and left portion. It seemed strange on severing the neck from the trunk to see three openings instead of two passing into the chest. At this stage I introduced a wand into it and found that it accompanied the œsophagus as far as it went. On splitting up the thorax and tracing its course, it was found to pass through the mediastinum, over the base of the heart, where it seemed to come into contact with the roof of the thorax, and this helped to form a boundary. It then accompanied the œsophagus on its course until it seemed to blend with it just at the orifice of the stomach, within the foramen sinistrum of the diaphragm, which seemed dilated. In the case of No. (2) bullock the swelling was never punctured as it was so extremely hard, but after he had

run much the same course and shared the same fate as No. (1), it was found that the swelling was also a sac quite similar to the other except that it contained dark red-coloured, broken-down pulpy material with a vile smell, and terminated abruptly within the chest against the inner aspect of the upper part of the last two or three ribs of the left side. After a careful scrutiny at no part could I discover any connection between it and the œsophagus.

PARASITIC EMBOLISM.

BY JOHN CONNOCHIE, M.R.C.V.S., AYTON.

THE subject of the above case was a five months old thoroughbred foal, still running with its mother. It had always been lively and a good doer until within a few days of my seeing it, when it had begun to droop. I found it scarcely able to stand, very feeble at rising, and stiff behind when it moved. It had also a very dejected appearance, tucked-up abdomen, and œdema of the hind legs between the hock and fetlock, especially on the outside. The temperature was 105°, and the breathing hurried, but the most alarming symptom was the character of the pulse. It was perfectly steady but very quick and throbbing, and the artery was full and tense. On auscultating the heart its action can be best described by the word violent.

Notwithstanding the undoubted seriousness of the illness it had still a remnant of appetite left, and sucked a little every time it was on its feet, which was not often, for it had generally to be assisted up, and then it was only able to stand for a few minutes.

A few doses of liq. ammon. acetatis were prescribed for the first two days, in addition to a small dose of castor oil, and enemas, for the bowels were constipated. Stimulating liniment was applied over the region of the heart, light and warm clothing put on, and the legs bandaged. As the pulse did not improve tincture of strophanthus was added to the aforementioned drug, and later on port-wine was given twice daily.

Gradually, but very slowly, the foal improved in every way except in regard to the pulse and action of the heart, which were, if anything, worse than before. The owner, however, was very sanguine of recovery, and therefore was astonished to find the foal lying dead one morning, apparently after a certain amount of struggling. This was nearly three weeks from the time of seizure.

The day previous to its death was the best it had passed since taking ill, for it had scarcely lain, had even attempted to play, and had fed greedily.

On opening the abdominal cavity attention was at once attracted to the cæcum, as it was discoloured and inflamed, and contained a large quantity of dark, red-stained pulpy ingesta. The remainder of the intestine was normal.

While removing the intestines from the abdomen a few lymphatic glands were found enlarged in the region of the great mesenteric artery, and indeed the latter was not easily distinguished, for it was thickened and surrounded by a considerable amount of exudate of old standing. On making an incision it was found to be nearly occluded with cheesy-looking fibrin, evidently not of recent origin, and on scraping it from the wall of the vessel and its branches several parasites were discovered, quite visible to the naked eye, dark red in colour, and about half-an-inch long. They were in all probability *Strongylus armatus.*

On exposing the heart and lungs the former showed a peculiar round shape, the apex not being in evidence at all. This was found to be due to an enormous ante-mortem clot distending the right ventricle. It entirely filled it, and even bulged into the auricle and pulmonary artery. Its outer layer, being of more recent date, was more red than yellow. All the valves without exception were thickened, and some had small, round, and hard elevations on them to the size of peas.

All the other organs were healthy. No parasites were detected in the heart.

Although the valves were so much involved the foal never presented a jugular pulse, nor was there any extensive œdema.

There can be no doubt but that the condition of the cæcum hastened the inevitable end.

Legal News.

THE EXTRAORDINARY ANGLESEY HORSE DISPUTE.

Claim against the Hon. Mrs. Ward.

President of the R.C.V.S. in the Box.

On Tuesday the adjourned hearing of the case brought by Mr. Hugh Williams, of Valley, Anglesey, against the Honourable Mrs. Ward, Old Colwyn, to recover damages for the loss of a mare through incorrect service by "Yorkshire Relish," was heard at Menai Bridge County Court before his Honour Sir Horatio Lloyd (the venue having been transferred from Holyhead by the consent of both parties).

Mr. J. Bryn Roberts, M.P. (instructed by Mr. T. R. Evans, Holyhead), appeared for the plaintiff, and Mr. Ellis Jones Griffiths, M.P. (instructed by Mr. Joseph Lloyd, Rhyl), acted for defendant.

At the last court evidence was given by the complainant as to the condition of the mare, on its arrival home from Valley after services; and plaintiff's son described the negligence on the part of the groom, the alleged negligence being that the groom did not assist the horse in any way during the service.

Further evidence was called on Tuesday as to this. Several men who were present in the yard agreed that no assistance was given.

Evidence was also called to show that such assistance was usual and necessary, this being given by Mr. Williams, M.R.C.V.S., Bodruxium, Anglesey, and Mr. O. T. Williams, M.R.C.V.S., Llangefni, who also stated that the rupture from which the mare was suffering could only be caused by incorrect and careless service.

The Defence.

For the defence, Corfield, the defendant's groom, swore that the mare was served correctly with the usual assistance. The animal was quiet, and nothing occurred to indicate anything unusual.

Professor Williams, Edinburgh, and President of the Royal College of Veterinary Surgeons, said he did not think the mare was suffering from rupture. Had there been such a rupture as stated by the expert witnesses on the other side, death would have ensued in twenty-four hours. No fæces would have been passed, and the mare could certainly not have

travelled eight miles in such a condition. Great pain would be immediately discernible, and she would pass blood. The rupture of the rectum could be caused by correct service, and also might occur independently of service.

Some amusement was caused at the termination of the witness' cross-examination by Mr. Bryn Roberts asking the Professor if Mr. Trevor Williams, one of the expert witnesses, was his cousin.

Witness, amid laughter, said he was told that his father's cousin married his mother's cousin, or something to that effect. He, personally, did not claim any relationship.

At this point, Mr. Trevor Williams was seen to rise from his chair, and instruct Mr. Bryn Roberts what the relationship really was, but the incident ended in hilarity when Mr. Ellis Jones Griffiths said that now the witnesses' pedigree had been satisfactorily established they would go on with the case.

THE VERDICT.

After addresses from counsel, the Judge summed up, informing the jury that the two points they had to be satisfied about were, first, was there negligence; and, secondly, did that negligence cause the death of the mare.

The jury retired, and returned in a few minutes, giving a verdict in favour of the plaintiff's claim, which was settled at £38, with costs.

Reviews.

Cassell & Co., Limited, are just publishing a new, enlarged, and revised edition of their *Encyclopædic Dictionary* in sixpenny numbers, which are well worth adding to one's library.

We were considerably disappointed in the reading of Courtney's *Veterinary Medicine*, new edition, edited by Mr. Hobday. To call it a work on veterinary medicine is a misnomer, as there is much more of what appertains to surgery than to medicine, and what there is of either is somewhat meagre and unsatisfactory. One page, and that the last, is devoted to swine fever—not enough for a student and quite valueless for the practitioner. Again, there are no plates or illustrations, and this detracts greatly from the value of such works. The book will be of use mainly to those who desire a short reminder on many subjects on which one is apt to become rusty. It is well got up, and nicely printed on good paper, but one always looks for this in books published by Messrs. Bailliere, Tindall, & Cox.

ROYAL COLLEGE OF VETERINARY SURGEONS.

FELLOWSHIP EXAMINATION.

A SPECIAL Examination for this Degree was held on Thursday, October 30th. Three candidates entered for the Examination, and the following passed and duly received the diploma:—James L. Webb, A. L. Farrant.

The Examiners were Professor J. Macqueen, J. Malcolm, Esq., and W. Hunting, Esq.

ARTHUR WM. HILL, *Secretary.*

ARMY VETERINARY DEPARTMENT.

The War Office has appointed a Committee on the "Army Veterinary Department." Its first meeting was held at the War Office on 28th November.

The following are the Members :—

EARL OF HARDWICKE, *Chairman.*
Major-General WYNN, D.A.A.G.
Colonel MARLING, 18th Hussars.
Major RODWAY, R.A.
Mr. HIGGINS, Accounts Department.
Veterinary-Colonel THOMSON, Director-General A.V.D.
Professor OWEN WILLIAMS, Edinburgh, President R.C.V.S.
Mr. JAMES SIMPSON, F.R.C.V.S., Maidenhead; and
Mr. C. F. WATHERSTON, *Secretary.*

Veterinary-Major K. Lees, F.R.C.V.S., to be Veterinary Lieutenant-Colonel, vice J. Reilly, retired. Veterinary Lieutenant R. J. Collings resigns his commission.

The steamship "Orcana" left Cape Town for England on October 28th, having on board the following invalids :—

Civil Veterinary Surgeons—Watson, Souter.
Veterinary Department—Lieutenants Bartlett, Quinland, and Beattie.

THE IMPERIAL SERVICE ORDER.

The King has made the undermentioned appointment to the Imperial Service Order, which His Majesty recently instituted for members of the Civil Service of the Empire as a recognition of long and meritorious service :—

. . . . . .

W. W. Smart, Esq., Veterinary Inspector, Board of Agriculture.

"Mr. Smart occupied the post of Senior Veterinary Inspector at Birkenhead Lairages for many years, and he recently left to take up similar duties at Deptford. During his stay here he made many friends, and we feel sure that our readers will join with us in congratulating him on being the recipient of this well-earned honour."—*Birkenhead and Cheshire Advertiser.*

NATIONAL VETERINARY BENEVOLENT AND MUTUAL DEFENCE SOCIETY.

THE Annual Meeting of the above Society will be held on Thursday, December 4th, 1902, at the Grand Hotel, Aytown Street, Manchester, at four P.M.

SAM. LOCKE, *Hon. Sec.*

PERSONAL.

WE regret that the name of Mr. James Ashton, M.R.C.V.S., of Bolton, was omitted from the list of visitors at the opening address in the New Veterinary College, Edinburgh, on 1st October.

CONTAGIOUS DISEASES ANIMALS ACTS, 1864 AND 1890.

SUMMARY OF RETURNS OF OUTBREAKS for the Four Weeks ending 22nd November 1902.

ENGLAND AND WALES

Swine Fever.	Anthrax.	Glanders (including Farcy).	Sheep-Scab (for month of October).
Outbreaks 145 Slaughtered 864	Outbreaks 35 Attacked 40	Outbreaks 79 Attacked 161	Outbreaks 78
SCOTLAND.			
Outbreaks 5 Slaughtered 28	Outbreaks 20 Attacked 30	None.	Outbreaks 10
IRELAND.			
Outbreaks 5 Slaughtered 20	None.	Outbreaks 1 Attacked 2	Outbreaks 29

Communications, Books, Journals, &c., Received.

Agricultural Journal (Cape of Good Hope); Berliner Thierärztliche Wochenschrift; La Clinica Veterinaria (Milan); Deutsche Thierärztliche Wochenschrift; Tannoform in Veterinary Medicine (March); The Sanitary Journal; Scottish Medical and Surgical Journal; Veterinary Record; La Riforma Veterinaria; Le Mois Scientifique (Paris); L'Echo Vétérinaire (Liège); Annales de Médecine Vétérinaire (Brussels); Johns Hopkins Hospital Reports; Journal of Comparative Medicine and Veterinary Archives; Recueil de Médecine Vétérinaire; Gazette Médicale de Paris; Modern Medicine; Johns Hopkins Hospital Bulletin; Il Veterinario di Campagna (Moncalieri); Le Bulletin Vétérinaire (Orleans); Revista de Medicina Veterinaria (Bucarist); La Revista Veterinaria (Buenos Aires); Zeitschrift für Fleisch-und Milchhygiene (Berlin); Buletinul Societatii de Sciinte diu Bucuresci-Romania; The Meat Trades Journal; The Dental Record.

Owing to extreme pressure on our space, we are compelled to leave over various articles.

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AND OTHERS.

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CONTENTS.

	Page
EDITORIALS—Editorial Announcement,	317
Ireland *v.* The rest of the Country,	318
ORIGINAL PAPERS—Bovine Pasteurellon in the Malay Peninsula,	321
Parturition and some Troubles associated with it. By E. P. Edwards, M.R.C.V.S.	327
Notes on Abdominal Pain and its Treatment. By J. Clarkson, M.R.C.V.S.	338
Annual Report of the Imperial Bacteriologist for India for the year 1901-1902,	345
Poisoning in Animals. By Vet. Lieut.-Col. J. A. Nunn, C.I.E., D.S.O., F.R.C.V.S.	348
A Year's Résumé. By Walter Perryman, M.R.C.V.S.	350
The Preparation of Antivenin,	353
The Use of Counter-Irritants in Respiratory Diseases. By Harry W. Percy, M.R.C.V.S.	355
The Plague of Ticks: Their Destruction by Oil Spraying. By C. P. Lounsbury, Government Entomologist, Cape Colony,	561

Continued on page vii.

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Each Candidate must be nominated in writing to the Secretary (either by himself or with his consent) by a Member of the Royal College of Veterinary Surgeons, with his Qualifications.

The Secretary will receive nominations not later than fourteen days before the date of Election.

By order,

November 1902. ARTHUR WM. HILL.

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VETERINARY PRELIMINARY EXAMINATIONS, 1903.

I. Examinations are held in Edinburgh three times in the year.

II. In 1903 the following will be the subjects of Examination :—

A. Compulsory Subjects, in which every Candidate must pass.

1. ENGLISH, including Dictation, Composition, Parsing, and Derivation. (The Parsing and Derivation will be taken from Goldsmith's Deserted Village.)
2. LATIN : Grammar ; Translation into English from Cæsar de Bello Gallico, Book III. ; and Virgil, Æneid, Book II., Lines 1-401 ; and translation of easy Passages, not taken from specified authors.
3. MATHEMATICS, including :—
   (*a.*) ARITHMETIC : The Common Rules and Vulgar and Decimal Fractions.
   (*b.*) ALGEBRA : Up to and including Simple Equations.
   (*c.*) GEOMETRY : Euclid, Books I.-III., with easy Deductions.

B. One of the following Optional Subjects :—

(*a.*) GREEK : Grammar ; Translation from Xenophon, Anabasis, Book II. Derivation of English words from Greek.
(*b.*) FRENCH : Voltaire's *Histoire de Charles XII.*, Books I.-IV. inclusive. Parsing and translation of simple sentences from English into French.
(*c.*) GERMAN : Schiller's *Der Neffe als Onkel.* Parsing and translation of simple sentences from English into German.
(*d.*) ITALIAN.
(*e.*) ANY OTHER MODERN LANGUAGE.
(*f.*) LOGIC : Jevons' Logic :—Lessons, I.-VI. ; VIII.-X. ; XII.-XXI. ; XXVII.-XXXI.

The compulsory and optional subjects *must all be passed at one Examination.*

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CONTENTS—*continued.*

PAGE

CLINICAL PAPERS—The Open Air Treatment of Pneumonia. By John Storie, M.R.C.V.S. 367
Two Unique Cases. By John Connochie, M.R.C.V.S. . . . 368
Parasitic Embolism. By John Connochie, M.R.C.V.S. . . . 369

LEGAL NEWS—The Extraordinary Anglesey Horse Dispute—Claim against Hon. Mrs. Ward, ... 371

REVIEWS—Encyclopædiac Dictionary, ... 372
Courtenay's Manual of the Practice of Veterinary Medicine. Revised by F. T. G. Hobday, F.R.C.S., &c. 372

ROYAL COLLEGE OF VETERINARY SURGEONS—Fellowship Examination, ... 372

ARMY VETERINARY DEPARTMENT, COMMITTEE ON, &c. . 373

SUMMARY OF RETURNS under Contagious Diseases Animals Acts, 1864 and 1890, for Four Weeks ending 22nd November 1902, ... 374

COMMUNICATIONS, BOOKS, JOURNALS, &C. RECEIVED, ... 374

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